Parents, their children, and sleep: Parental help-seeking behaviours and influences on child sleep

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This thesis is submitted in partial fulfilment of the requirements of the award of Doctor of Philosophy

June 2018

Acknowledgements

I would like to extend thanks to my supervisors Dr Luci Wiggs and Professor Jane Appleton. They have offered expert guidance and support throughout the course of this research project. I cannot express how grateful I am to them for their help and encouragement, which were invaluable to the successful completion of this thesis. Particular thanks to Dr Luci Wiggs, for her mentorship that has been more than appreciated.

I would also like to thank the organisations and individuals who provided support to me in recruiting participants, and most of all the research participants themselves who willingly gave up their time and offered valuable insights.

Thanks also to my fellow past and present PhD students at Oxford Brookes University for providing ongoing help and support throughout the course of the research. Without your understanding, encouragement, and constant supply of tea and cake this would have been a much more challenging process. Thank you also to my friends and family who have provided unwavering support and patience and helped to keep me motivated, particularly during writing up the thesis. Special mention to my partner Sam, who has been incredibly understanding and supportive throughout my PhD journey.

Finally, I would also like to thank Oxford Brookes University and most specifically the Nigel Groome scholarship which funded this research.

Abstract

Background: Child sleeplessness problems are common. There are a variety of sources which parents can and do utilise when seeking information about child sleep. However, very little is known about how, when, and why parents seek help for their child's sleep. It is also well established that a range of parent, child, and environmental factors can influence child sleep. Yet there are gaps in existing knowledge regarding the extent to which parental cognitions, knowledge about sleep, and their sleep practices are related and linked to child sleep.

Method: In study one, 266 parents of 6-36 month olds completed an online questionnaire, which provided details of their child's sleep, parental knowledge about child sleep, and help-seeking behaviours. In study two, 46 mother, father, and toddler (12-24 month old) dyads participated. Each parent completed a questionnaire, which provided details about a range of parent and child variables, including parental perceptions of sleep, thoughts about sleep, sleep-related practices, and knowledge about sleep. Actigraphy provided an objective measure of child and primary night-time caregivers sleep.

Results: Study one suggested that parents held a preference for informal types of sources of information for child sleep. A range of preferences for and barriers to parents' use of different sources and treatments were identified. Differences between parents' existing and ideal sources were also highlighted. Study two suggested that parental cognitions about their own sleep predicted their cognitions about their child's sleep. Poorer knowledge about child sleep was associated with problematic parental sleep-related practices. Notable differences were also identified between mothers and fathers.

Conclusion: The thoughts, feelings, beliefs, attitudes, and knowledge, of both parents, are relevant to children's sleep. Understanding the relationship between these factors could have theoretical and clinical implications for how child sleep is conceptualised, assessed, and treated.

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Glossary of abbreviations

AASM	American Academy of Sleep Medicine
AS	Active sleep
BCSQ	Brief Child Sleep Questionnaire
BISQ	Brief Infant Sleep Questionnaire
CBT	Cognitive Behavioural Therapy
CBT-I	Cognitive Behavioural Therapy for Insomnia
CCQ	Child Characteristics Questionnaire
CIO	Cry it out
CSDI	Composite Sleep Disturbance Index
CSP	Child sleeplessness problem
DBAS	Dysfunctional Beliefs and Attitudes about Sleep
ECG	Electrocardiogram
EEG	Electroencephalography
EMG	Electromyography
EOG	Electrooculography
GHQ	General Health Questionnaire
HCP	Healthcare professional
HV	Health Visitor
ICSD	International Classification of Sleep Disorders
ISQ	Infant Sleep Questionnaire
ISVIS	Infant Sleep Vignette Interpretation Scale
MCISQ	Maternal Cognitions about Infant Sleep Questionnaire
MRC	Medical Research Council
NHS	National Health Service
NREM	Non-rapid eye movement
OSAS	Obstructive Sleep Apnoea Syndrome
PCISQ	Parental Cognitions about Infant Sleep Questionnaire
PERB	Post extinction response burst
PIBBS	Parental Interactive Bedtime Behaviour Scale
PNCG	Primary night-time caregiver
PSOC	Parenting Sense of Competence Questionnaire
PSG	Polysomnography
PSIS	Parent-Child Sleep Interactions Scale
PSQI	Pittsburgh Sleep Quality Index

QS	Quiet sleep
REM	Rapid eye movement
SAD	Seasonal Affective Disorder
SCN	Suprachiasmatic nucleus
SES	Socioeconomic status
SIDS	Sudden infant death syndrome
SPAQ	Sleep Practices and Attitudes Questionnaire
SPAQ-A-K	Sleep Practices and Attitudes Questionnaire-Adult-Knowledge
SPAQ-A-P	Sleep Practices and Attitudes Questionnaire-Adult-Practices
SPAQ-C-K	Sleep Practices and Attitudes Questionnaire-Child-Knowledge
SPAQ-C-P	Sleep Practices and Attitudes Questionnaire-Child-Practices
SWS	Slow wave sleep
UK	United Kingdom

Chapter 1

Introduction: Sleep and sleeplessness in children

The purpose of this chapter is to provide a general overview of sleep and sleeplessness in children. The chapter will begin in section one by presenting a brief overview of normal sleep in children and common theoretical approaches of why we sleep. An overview of different assessment methods for child sleep will be presented before briefly highlighting the important developmental role of sleep in children. The range of adverse outcomes associated with not obtaining sufficient amounts of sleep will also be presented. Section two will discuss the range of sleep disorders and sleep problems that can be experienced, specifically highlighting the issue of sleeplessness problems in infants and young children. This will be followed by information relating to the prevalence and persistence of child sleeplessness problems (CSPs), and an overview of the factors associated with CSPs. Section three will provide a summary of the range of management options available for sleep disorders. A more detailed account of the management options available specifically for CSPs will be highlighted. The efficacy of intervention methods will be noted along with

potential issues that may impact upon the efficacy or parental use of different methods. The chapter will conclude with a brief chapter summary.

1.1. Normal sleep in children

Sleep is a biologically driven behaviour, influenced by various processes and rhythms, which is essential for healthy functioning. Sleep is a naturally reoccurring reversible restful state, during which alertness and responsiveness to the surrounding environment is reduced (Carskadon & Dement, 2011). While levels of activity may appear reduced, during sleep extensive brain activity is occurring (Carskadon & Dement, 2011; Zee & Turek, 1999). Infant sleep evolves and changes rapidly during the first few years of life (Galland, Taylor, Elder, & Herbison, 2012; Henderson, France, & Blampied, 2011). This sleep evolution occurs as part of a complex and dynamic process of physical, biological, and physiological changes and development.

Biological and physiological aspects of adult and child sleep

Theoretical models of human sleep-wake patterns highlight two biological processes in the regulation of sleep. Borbely's (1982) model suggests the regulation of sleep and wake occurs as a result of two distinct but interrelated processes, circadian rhythms and homeostasis. One process promotes sleep (process S) and one process maintains the biological cycle of internal circadian rhythms, including that of sleep-wake regulation (process C) (Gillette & Abbott, 2005). Process S or the homeostatic need for sleep is an internal biochemical system involved in regulating the internal bodily environment and functions. Sleep-wake homeostasis functions by the accumulation of a need or pressure to sleep. The longer an individual has been awake, the stronger the homeostatic need to sleep and therefore the greater the pressure to sleep. This pressure increases until the individual achieves an adequate amount of sleep. Once adequate sleep has been achieved the homeostatic need for sleep is dissipated and the potential of awakening is increased.

Circadian rhythms run on roughly 24-hour cycles during which regular biological and physiological processes are repeated. One of the key structures involved in the process and regulation of sleep is the suprachiasmatic nucleus (SCN) which is situated within the hypothalamus and receives information from the eyes

regarding light exposure, as well as sleep-wake state and the wider environment (Gillette & Abbott, 2005). Circadian rhythms are strongly influenced by light, which acts as an environmental cue for sleep-wake cycles. In an individual with a normally functioning circadian rhythm, exposure to natural light results in process C opposing the need to sleep during the daytime, and helping to maintain wakefulness. While process S and C are independent, the interaction between the two functions to promote appropriate sleep and wakefulness, and guides the timing of sleep and wake (Davis, Parker, & Montgomery, 2004a).

Both process S and C are under-developed at birth but appear and continue to develop throughout early infancy (Davis, Parker, & Montgomery, 2004a; McGraw, Hoffmann, Harker, & Herman, 1999). The impact of circadian rhythms on infant sleep is less influential until around 3 months of age, when the neural pathways involved in the process reach maturity (Lushington, Pamula, Martin, & Kennedy, 2013; Rivkees, 2003).

Sleep architecture in adults and children

The architecture of normal adult and child sleep (post 6 months of age) is similar, and features cyclical stages of REM (rapid eye movement) and NREM (non-rapid eye movement) sleep. NREM sleep is characterised by synchronous brain waves and in the deeper stages by the presence of delta waves, which are brain waves of a high amplitude and low frequency alongside low levels of physiological activity, whereas REM sleep is characterised by desynchronized brain wave activity, muscle atonia, and bursts of rapid eye movements (Carskadon & Dement, 2011). Healthy sleep is comprised of four distinct stages: Stages N1, N2, and N3 are experienced as non-rapid eye movement (NREM) sleep, with stage N3 commonly known as slow wave sleep (SWS) due to the increased presence of delta waves, with the final stage being rapid eye movement (REM) sleep (Iber, Ancoli-Israel, Chesson, & Quan, 2007). In normal adults, initial NREM stages must be experienced to progress through to REM sleep. A full sleep cycle is achieved in 90-110 minutes. NREM sleep accounts for 75-80% and REM sleep 20-25% of total sleep time (Carskadon & Dement, 2011). Physiological changes in brain activity, heart rate, blood pressure, sympathetic nerve activity, muscle tone, respiration, airway resistance, and

body temperature differ between REM and NREM sleep (Somers, Dyken, Mark, & Abboud, 1993; Madsen et al., 1991). While qualitatively different both REM and NREM stages of sleep are necessary to achieve a full sleep cycle.

Due to the immaturity of the developing brain, normal sleep stage categorisation is not possible in newborn infants, and a different sleep categorisation is used. In the first few months of life the equivalent of adult REM sleep is active sleep (AS), while NREM sleep equivalent is known as quiet sleep (QS), and there is an additional stage of indeterminate sleep whereby the features of sleep are not clearly classifiable as either AS or QS (Ednick et al., 2009). AS accounts for around 50% of newborn sleep and is the stage entered upon initially falling asleep (Carskadon & Dement, 2005; Anders & Keener, 1985). Infants' sleep cycles are shorter than adults averaging around 50-60 minutes (Grigg-Damberger, 2016; Jenni & Carskadon 2000). As children develop, distinct sleep stages are established (Carskadon & Dement, 2011). As with adult sleep, there are physiological differences between AS and QS sleep in infants. AS is commonly characterised by rapid eye movements, motor and facial activity, as well as variable heart rate and irregular breathing, whereas QS tends to be much less active with regular heart rate and breathing patterns (Lushington et al., 2013).

The lack of fully developed circadian rhythms results in early infant sleep architecture being disorganised. Therefore, normal maturational infant sleep is commonly characterised by short sleeps and regular wakings during both the day and night (Davis et al., 2004a). Following the maturation of the brain structures, regulatory systems, and circadian processes involved in sleep within the first few months of life, infants' sleep is increasingly consolidated to overnight sleep, and from around 6 months of age closely resembles that of an adult in some respects (Lushington et al., 2013; Sheldon, 2002). Within the first year of life the amount of AS reduces from 50% to around 35-40%, while concurrently, QS increases (Anders & Keener, 1985).

During roughly the first 12 months, a developmental trend occurs in healthy infants whereby longer overnight sleep is obtained, less time is spent napping in the day and less wakefulness occurs during the night, culminating in achieving all of their required sleep in a consolidated overnight period (Acebo et al., 2005;

Galland et al., 2012; Sadeh, Mindell, Luedtke, & Wiegand, 2009). Nevertheless, there is considerable variation and variability in child sleep behaviour at any given age (Mindell et al., 2016).

1.1.2. Why do we sleep?

There is no current consensus as to the exact reasons why we sleep. However, there are an array of different theories. The main theories are: repair and restoration, energy conservation, and information processing. These are briefly summarised below.

The repair and restoration theory proposes that sleep is required to repair and restore the brain and the body. Specifically, it suggests that biological functioning and mental abilities are restored during sleep. This theory posits that if insufficient sleep is obtained then appropriate repair and restoration cannot take place, ultimately resulting in the body and brain failing. Oswald (1966) highlighted that the different types of sleep experienced by the human body were responsible for different aspects of repair and restoration. Changes seen in brain activity in REM sleep were regarded as responsible for allowing the brain to grow, repair, and reorganise, while SWS, experienced in NREM sleep, was the time during which the body grew and repaired as well as when key growth hormones were released. Horne (1988) extended Oswald's theory further, suggesting that human sleep consisted of core sleep, which was made up of REM and SWS, as well as optional sleep. He theorised that brain repair and restoration occurred during core sleep, whereas bodily repair and restoration predominantly occurred during optional sleep.

The evolutionary or energy conservation theory suggests that sleep occurs as an evolutionary mechanism to conserve energy. It is proposed this is achieved due to the body having a lower metabolic rate during sleep. Webb (1974) offered a variation, the hibernation theory, which suggested the main function of sleep was to encourage rest when it was dark to conserve energy. The basis of the theory was that animals that conserve more energy are more likely to survive. It has been argued this theory provides an explanation of why animals with a small body mass generally require greater amounts of sleep, although there are certainly exceptions to this pattern.

The information processing or consolidation theory suggests sleep occurs in order to process the information assimilated over the day, and to allow brain functions to prepare for the next day (Stickgold, Whidbee, Schirmer, Patel, & Hobson, 2000). This theory is supported by experimental research, which has demonstrated that sleep deprivation results in an inhibited ability to recall and remember information learnt (Stickgold, 2004), strongly suggesting that sleep reinforces learning and memory processes. It has also been suggested that REM sleep is specifically necessary for memory consolidation; Crick and Mitchison (1983) proposed the storing of memories and removal of any connections between neurons, which were unnecessary but had been formed during wakefulness, both occurred during REM sleep.

While some of the most common and popular theories behind why we sleep have been presented, all have weaknesses and no single account adequately explains all the likely functions of sleep. Nevertheless, it is clear that sleep is essential for healthy functioning and plays a key role in cognitive aspects such as information processing and memory consolidation, emotional and mood regulation, as well as physical health and restorative functioning (Xie, et al., 2013; Walker, 2009; Stickgold & Walker, 2007; Yoo, Gujar, Hu, Jolesz, & Walker, 2007; Tononi & Cirelli, 2006; Stickgold, 2005; Spiegel, Leproult, & Van Cauter, 1999; Dinges et al., 1997). For healthy functioning, in adults and children, both an adequate amount of sleep and good quality sleep are required, although there is variation in individual sleep need (Paruthi et al., 2016; Watson et al., 2015; Luyster, Strollo, Zee, & Walsh, 2012). Sleep quality is commonly quantified by sleep efficiency (ratio of time asleep to overall time in bed), degree of disruptions to sleep, and sleep onset latency (time to achieve full transition from wakefulness to sleep).

1.1.3. Sleep assessment methods

Sleep can be measured in a multitude of objective and subjective ways. Objective measures assess physical traits, behaviours or functions, which can be accurately and impartially assessed, whereas subjective measures are based on an individual's perspective or account, which relies on the information that they report. Both objective and subjective data are valuable and useful albeit in different ways.

Objective measures of sleep

The gold standard for measuring and assessing sleep in adults and children is Polysomnography (PSG). PSG is an objective measure of sleep involving the recording of various physiological parameters. The main tools used in PSG are electroencephalography (EEG) to assess brain waves and activity; electromyography (EMG) to monitor skeletal muscle activity or muscle activation; electrocardiogram (ECG) to measure heart rate and rhythm; and electrooculography (EOG) to monitor eye movements. Blood oxygen levels and breathing are frequently also monitored and recorded. A researcher or clinician scores the data obtained from PSG recordings manually in accordance with standardised scoring rules (Berry et al., 2017; Iber, Ancoli-Israel, Chesson, & Quan, 2007; Rechtschaffen & Kales, 1968). PSG generally takes place in a hospital or sleep clinic setting, over a few nights at most. It has been widely used, in both adults and children, to assess or diagnose sleep disorders with an objective or physical cause, and those based on abnormal biological or physiological functioning in sleep.

Another objective measure of sleep is actigraphy. Actigraphs are small lightweight wristwatch-sized devices that can be used to infer sleep-wake cycles by the presence or absence of movement (usually limb movement). Actigraphy has been shown to be both a reliable and valid method of measuring sleep-wake cycles in healthy adults, children, and infants (Meltzer, Montgomery-Downs, Insana, & Walsh, 2012; Sadeh, 2011; Morgenthaler et al., 2007; Sadeh, Hauri, Kripke, & Lavie, 1995). Actigraphy is less expensive and time consuming than PSG, and the devices can be worn in the home without the potentially disruptive need to go into a sleep laboratory or hospital. Patients can wear actigraphs for short periods or for days or weeks at a time, as required. Actigraphs can be set in advance to collect data at different time delays (Meltzer et al., 2012). Actigraphs will continually collect data whether worn or not, therefore to aid interpretation of the data, a sleep diary must be kept for the period of assessment. Data can then be scored using various computerised algorithms used to interpret the data collected. A range of sleep parameters can be estimated depending on what data is sought from the assessment. Regularly used parameters include sleep duration, sleep efficiency, sleep onset, and

number or duration of any night-wakings (Meltzer et al., 2012; Tikotzky, Sadeh, & Glickman-Gavrieli, 2011).

An additional objective measure of sleep is videosomnography, a time-lapse video recorded continuously at a slow speed using specialist video equipment (Burnham, Goodlin-Jones, Gaylor, & Anders, 2002; Sivan, Kornecki, & Schonfeld, 1996; Anders & Keener, 1985). This method allows the monitoring of a full night or a specific time period of sleep as well as, in children, any parental interactions or behaviours with their child. The video can be reviewed, coded and analysed, as appropriate, by a researcher or clinician according to the data sought.

Subjective measures of sleep

There is a range of subjective measures that can be used to assess sleep. These tend to take the form of self, or for children parentally, reported measures such as sleep diaries, logs or questionnaires. Diverse types of data and information can be obtained from the different forms of measures. A standardised sleep diary exists for adults (Carney et al., 2012), but no such diary has been developed for use with children. When assessing child sleep, parents or primary-caregivers generally complete diaries or logs of their child's sleep on a daily, weekly or monthly basis. The general aim is to capture details about the child's sleep-wake patterns and/or specific sleep behaviours. However, the precise content of each diary may vary depending on the area of investigation (Matthey & n c, 2012; Henderson, France, Owens, & Blampied, 2010; Sadeh, Flint-Ofir, Tirosh, & Tikotzky, 2007; Tikotzky, et al., 2011; Tikotzky & Sadeh, 2009; Morrell, 1999).

Questionnaires are another type of subjective report measure, which can take many forms; some provide an account or snapshot of sleep patterns and behaviours, whereas others derive more specific details regarding particular aspects of the sleep patterns or behaviour. Questionnaires can be self or parental report depending on the age of the patient. Data obtained can be used to screen for sleep-related problems or to classify sleep difficulties.

There are a small number of parent report questionnaires that are commonly

used to assess child sleep: the Composite Sleep Disturbance Index (Wiggs & Stores, 1998) scores are derived from the duration and frequency of parentally reported child sleep problems around settling and waking; the Brief Infant Sleep Questionnaire (BISQ) (Tikotzky & Sadeh, 2009), and expanded version of the BISQ (Mindell et al., 2011a), function as screening tools to assess paediatric (validated with 0-36 month olds) sleep patterns and sleep behaviour as well as also providing information on broader aspects relating to the child's sleep environment and parental sleep hygiene habits in relation to the child; the Brief Child Sleep Questionnaire (BCSQ) is derived from BISQ (Tikotzky & Shaashua, 2011), and is similar in function but is used with older children; the Infant Sleep Questionnaire (ISQ) (Morrell, 1999) provides an account of child sleep behaviour for use with older infants of 12-18 months, and has also been frequently used as a diagnostic measure to identify children with problematic sleep.

Questionnaire measures can be used in both clinical and research environments (Spruyt & Gozal, 2011). The applicability of individual questionnaires may vary depending on individual circumstances such as the age of the child, aspect of the child's sleep that needs to be assessed, and if the tool is to be used in a clinical and/or research environment.

1.1.3.1. Challenges associated with measures of child sleep

One of the major limitations of PSG and videosomnography is the fact that these methods can be costly and time consuming to implement. In addition, as data is gathered over a short time period (usually only a night or two), they are not useful for identifying patterns in sleep behaviour. Due to the specialist types of equipment required, particularly for PSG, alongside the fact they are usually conducted in a lab setting, can mean these measures are disruptive and may not provide a representative account of typical sleep. This is particularly relevant in children, some of whom will not tolerate the monitoring equipment of PSG. Similarly, some parents or families may feel uncomfortable with their interactions with their child being recorded, and may perceive this approach as intrusive. Finally, as PSG and videosomnography assess specific aspects of sleep physiology or behaviour, they are not always suitable assessment options depending on the data required in individual cases.

There are also drawbacks to the use of actigraphy. To ensure raw movement data can be accurately interpreted, a valid reliable sleep diary is required to be completed alongside the child wearing an actigraph. Accuracy of parental record keeping can impact upon the interpretability of the actigraphy data obtained. In addition, as actigraphs infer sleep-wake from movement, they may not give accurate information if the person wearing them shares a bed, for example with a partner, or if co-sleeping. Further while actigraphy has been shown to be valid and reliable in assessing sleep-wake in normal populations, its validity when used with special populations and those with severely disturbed sleep is less clear (Martin & Hakim, 2011; Sadeh, 2011). In addition, actigraphy is only able to determine sleep and wake and cannot determine aspects of sleep structure (e.g. sleep stages) (Martin & Hakim, 2011).

While actigraphs have been widely used, concerns have been raised about their sensitivity and specificity when used in child populations (Meltzer et al., 2013). Sensitivity reflects how accurately actigraphy identifies epochs as sleep when compared with polysomnography, while specificity refers to how accurately actigraphy wakes are also scored as such by polysomnography. Therefore, a totally accurate actigraphy result would identify all periods of sleep and wake, thus being both sensitive and specific. However, in many cases sensitivity is high but specificity is low (Meltzer et al., 2013). There are also many different commercially available devices and scoring algorithms that can be used, with different degrees of accuracy, which can impact upon the comparability and validity of results (Meltzer et al., 2012; Sadeh, 2011).

While subjective assessment methods tend to be more cost effective and less time consuming than objective measures in many cases, they are not without their limitations. A key challenge associated with subjective parental report assessments of child sleep is therefore the issue of reliability or reporter bias. Parents may over or under report a specific aspect or characteristic relating to their child or their behaviour, which is not an accurate representation. Evidence suggests parents may unintentionally report inaccurately on their child's sleep (Dayyat, Spruyt, Molfese, & Gozal, 2011; Mindell, Kuhn, Lewin, Meltzer, & Sadeh 2006; Sadeh, 1994). In some cases, it may also be challenging for

parents to precisely report on aspects of child sleep. For example, parents may only be able to accurately report on child night-waking if they are either in close proximity to the child or if the child is signalling, which may be characterised as crying or calling out. However, this may not necessarily encapsulate all of the child's actual wakes (Weineraub et al., 2012). Similarly, if children are put to bed awake and left to settle themselves to sleep, parents may not be able to accurately report sleep onset latency (i.e. time taken to fall asleep). Because of these potential challenges, subjective measures are not always considered to be as reliable as objective measures. Yet arguably, subjective tools are key when assessing child sleep, as one of the main reasons help may be sought for help for child sleep is if it is perceived as problematic or disruptive by parents (Loutzenhiser, Ahlquist, & Hoffman, 2015; Wiggs, 2007).

Factors other than the child's sleep may also have a role to play in how parents appraise, perceive, and report on their child's sleep. Commonly identified factors include social and cultural expectations, as well as aspects relating to the parent such as psychopathology, cognitions**,** perceptions of poor parental daytime functioning and sleep quality, fatigue, and factors in the child (Loutzenhiser et al., 2015; Dayyat et al., 2011; Sadeh, Mindell, & Rivera, 2011b**;** Morrell, 1999). Sadeh (1994) also raises an important point that parental reports may unintentionally misrepresent their infant's sleep due to fatigue associated with being sleep deprived, as a result of their infant's poor sleep. The way in which questions are asked or phrased has also been shown to affect how parents report about child sleep (Matricciani, 2013).

Sleep is a practice strongly entrenched in social and cultural aspects (Jenni & O'Connor, 2011). Specifically, social and cultural contexts form the basis of what is deemed acceptable, which feeds into the establishment of societal norms and expectations regarding child sleep. Further, these expectations may influence parents' perceptions of acceptable sleep behaviour and how they approach managing their child's sleep. Actual child sleep is then interpreted according to the socially and culturally constructed framework based on parents' own perceptions, expectations, and experiences (Jenni & O'Connor, 2011). This cultural basis for sleep perhaps explains why different cultures exhibit different sleep behaviours and hold, at times, alternate beliefs and

attitudes regarding child sleep and appropriate sleep behaviours (Mindell, Sadeh, Kohyama, & How, 2010a; Mindell et al., 2010b). These findings originated from a large-scale cross-cultural comparison of parents' bedtime behaviours and child sleep in 29,287, 0-36 month olds. However, conclusions were based only on one parentally reported questionnaire and as previously highlighted there are multiple reasons why this sort of subjective data may not be reliable (Mindell et al., 2010a; Mindell et al., 2010b).

Parents may hold unrealistic expectations about a child's sleep pattern or quantity. This can result in parental perceptions not necessarily being determined by the child's actual sleep or the impact on the child's functioning, but instead by whether the child's behaviour is deemed acceptable or problematic by a parent (Mindell et al., 2010a; Wiggs, 2007). Therefore, a parent reporting a problem does not necessarily mean that a child is not obtaining adequate sleep. On the other hand, a parent may not deem an infant's sleep to be a problem, but their child may not be obtaining adequate sleep. Consequently, the same child's sleep behaviour may be deemed as problematic by one parent but not by another (Loutzenhiser et al., 2011; Mindell et al., 2006).

While there are strengths and weaknesses associated with all the aforementioned assessment tools, ultimately the most appropriate and suitable measure(s) for individual cases will depend on the type of data being sought or the particular question being asked.

1.1.3.2. Limitations of measures used in child sleep assessment

There are methodological challenges in drawing conclusions and synthesising the existing literature on child sleep. This stems primarily from the variability in measures, definitions, terminology classifications, and methodologies, which have been employed when conceptualising and researching child sleep (Meltzer et al., 2012; Sadeh, 2011).

Firstly, as has been detailed above, there is a broad range of measures that can be used to assess child sleep. A primary consideration then is what measurement tool has been employed, as different tools may return very different information or types of data. An obvious comparison is the difference

between objective and subjective measures. Parental reports have tended to be comparable with actigraphy for some aspects of child sleep such as sleep onset and sleep duration, but less reliable for other aspects such as sleep quality, as well as typically overestimating actual sleep time and underestimating the number of night-wakings when compared to actigraphic data (Tikotzky & Shaashua, 2011; Sadeh, 1996). Agreement rates for many aspects of child sleep, when assessed using both objective and subjective measures contemporaneously, have been found to be poor (Werner, Molinari, Guyer, & Jenni, 2008; Sadeh, 1994).

There is considerable variation in both experimental and clinical practice regarding what sleep parameters may be used to assess and/or define child sleep. For example, children have been classified as having sleep problems based on objective sleep data, sleep logs, validated child sleep questionnaires, research definitions of a specific area of interest, and maternal report (either a binary yes/no question about their perception of their child's sleep as problematic or based on other ratings, such as features of their child's sleep). In many research studies the frequency, severity and chronicity of sleep problems or combination of these aspects are commonly used to categorise children as having CSPs or not (Mindell et al., 2006). In a large-scale review of the age at which infant's sleep was consolidated, none of the 11 studies included used the exact same definition or number of nights required to meet the criteria of sleeping through the night (Henderson et al., 2011). The variability in the measures used and definitions of specific parameters mean CSPs are conceptualised and defined differently across studies.

Child sleep also differs across development and in different cultural settings (Mindell, Sadeh, Wiegand, & How, 2010b). Therefore, there are clear challenges relating to the comparability and generalisability of findings because, across studies, samples include broad or diverse age ranges and emanate from different cultural settings.

1.1.4. Developmental role of sleep in children

Infants and young children's primary early life activity is sleep (Dahl, 1996). A recent systematic review found that infants sleep duration over a 24-hour period averaged nearly 13 hours with a broad range of upper and lower values of 9 to

over 16 hours. In another study, 6-month-olds were reported to sleep on average just over 14 hours per 24-hour period (Iglowstein, Jenni, Mollinari, & Largo, 2003). Toddlers and preschool children aged up to 5 years old slept on average nearly 12 hours over a 24-hour period, with a range of around 10 to 14 hours (Galland et al., 2012). Taken together, these studies illustrate the significant amount of time that young children spend asleep, as well as the large variability of sleep duration in early life.

Given that children spend a significant proportion of time asleep and simultaneously grow, mature, and develop rapidly in early infancy, it has been suggested that sleep may play an important role in children's development. Alongside the contribution of biological and environmental factors, sleep has been suggested to be key to children's overall development (Galland & Mitchell, 2010). The importance of sleep has also been linked to different aspects of development, including brain development and physical maturation (Lampi & Johnson, 2011; Peirano & Algarin, 2008; Dang-Vu, Desseilles, Peigneux, & Maquet, 2006), cognitive development including in relation to learning and memory (Konrad, Herbert, Schneider, & Seehagen, 2016; Friedrich, Wilhelm, Born, & Friederici, 2015; Seehagen, Konrad, Herbert, & Schneider, 2014), the development of language skills (Dionne et al., 2011), as well as broader behaviours such as their approachability and adaptability (Spruyt et al., 2008).

1.1.5. Adverse outcomes of insufficient sleep

There is a well-established body of literature that demonstrates the adverse outcomes associated with lack of sleep in adults, including impairments in physical health (Wu, Zhai, & Zhang, 2014; Mullington, Haack, Toth, Serrador, & Meier-Ewert, 2009), cognitive functioning (Lim & Dinges, 2010; Banks & Dinges, 2007; Durmer & Dinges, 2005), and mood (Babson, Trainor, Feldner, & Blumenthal, 2010; Pilcher & Huffcutt, 1996).

There is also an increasing body of literature that links poor child sleep quality or quantity with adverse concurrent and future outcomes across a range of domains, including behavioural and emotional regulation problems, temperament, cognitive development and performance, physical health, and injury, as discussed below.

Behavioural and emotional regulation problems

Different aspects of children's sleep have been linked to different types of behavioural problems. Short sleep duration of less than 10 hours and fragmented sleep, experienced as frequent night-wakings, in toddlerhood have been linked to concurrent and later at school-age emotional and behavioural problems (Sivertsen et al., 2015; Scher, Hall, Zaidman-Zait, & Weinberg, 2010; Touchette et al., 2007). Understandably, a much smaller body of literature has explored experimental manipulations of child sleep, which could highlight causal pathways between child sleep and behavioural and emotional outcomes. Evidence from one experimental study of acute sleep restriction (via nap restriction) in 30-36 month olds identified that children's emotional processing and expression was impacted (Berger, Miller, Seifer, Cares, & Lebourgeois, 2012). However, much of the literature in this area has focused on sleep duration, which neglects the identification of any potential association between sleep quality and negative behavioural and/or emotional outcomes.

Temperament

Increased nocturnal sleep duration in infancy has been found to be associated with an easier temperament, determined predominantly through higher levels of approachability (Spruyt et al., 2008). Whilst this association was present when both parental report and objective actigraphy measures of child sleep were used, the strongest associations between child sleep and temperament were based on parental report measures. Another study of 30 typically developing children found the only association between child sleep measured via actigraphy and temperament based on maternal report was with rhythmicity (Scher, Tirosh, & Lavie, 1998). While there appears to be a link between child sleep and aspects of temperament, this association is not consistent and appears to be strongest when parental report measures of sleep are used. However, factors other than the child's temperament and/or sleep may have influenced parental assessments of these aspects in their child. This may explain why studies that have used parental report measures of child sleep appear to identify stronger associations than when objective measures are used to assess child sleep.

Cognitive

Various aspects of child sleep have also been linked to different facets of cognitive development. In a study of 50 10-month old infants better sleep quality, as determined by sleep efficiency, was associated with improved concurrent cognitive development (Scher, 2005). Increased nocturnal sleep at 12 and 18 months old has been related to increased performance on executive functioning tasks at 18 and 26 months old (Bernier, Carlson, Bordeleau, & Carrier, 2010). Short sleep duration in infancy and toddlerhood has been found to be linked to reduced verbal and non-verbal cognitive performance at school age (Touchette et al., 2007).

Aspects of child sleep organisation have also been associated with cognitive outcomes. Sleep-wake circadian regulation at 7 and 19 months were predictive of mental development aged 2 and language abilities at age 3 (Dearing, McCartney, Marshall, & Warner, 2001). In addition, lower sleep consolidation at 6 and 18 months, but not 30 months old, was found to be associated with reduced language skills development in a Canadian longitudinal twin study (Dionne et al., 2011).

Physical outcomes

Short sleep duration in young children aged 6–24 months was identified as a risk factor for being overweight aged 3 (Taveras, Rifas-Shiman, Oken, Gunderson, & Gillman, 2008). An association between short sleep duration and weight gain later in life, including into adulthood has also been identified (Magee & Hale, 2012).

Injury

Sleep duration and time awake, specifically sleeping less than 10 hours a day alongside having been awake for 8 hours or more, has been found to be associated with a higher risk of suffering an injury in a study of Italian preschool children (Valent, Brusaferro, & Barbone, 2001). The presence of CSPs have also been linked to higher levels of injuries. American children aged 3-7 years old who sustained two or more injuries across a 2-year period experienced an increased number of CSPs in comparison to children who sustained no or less than one injury in the same period (Owens, Fernando, & McGuinn, 2005).

Compared to research looking at older children, there has been less of a systematic focus on injury risk in infants and young children, perhaps due to the challenges of studying the links between sleep and injury in this age group. Nevertheless, a relationship has been identified in toddlers and pre-schoolers between inadequate sleep and accidental injury requiring medical attention (Koulouglioti, Cole, & Kitzman, 2008). Inadequate sleep quantity has been found to result in impaired functioning, including increased inattentive behaviour, which may explain the link between sleep and injury in school-aged children (Fallone, Acebo, Arnedt, Seifer, & Carskadon, 2001).

Sleep problems in children and outcomes later in life

Sleep problems in older children have been associated with behavioural and emotional problems later in life. For example, childhood sleep problems at age 4 predicted mid-adolescent emotional and behavioural problems, even when other potentially interacting factors were controlled (Gregory & O'Connor, 2002). Furthermore, sleep problems in pre-school aged children predicted behaviour, hyperactivity and anxiety at 7 years (Gregory, Eley, O'Connor, & Plomin, 2004). Sleep problems in young children have also been linked to poorer functioning in some neuropsychological aspects when they were assessed in adolescence (Gregory, Caspi, Moffitt, & Poulton, 2009). However, other studies have reported contradictory findings of the links between CSPs and later outcomes. For example, in a sample of 225 families, transient, recurring, or persistent parentally reported sleep problems assessed at 4, 12, and 24 months were not found to be associated with adverse outcomes in the child, mother, or child-parent relationship at 6 years old (Price, Wake, Ukomunne, & Hiscock, 2012b).

It is important to note that the design of many of the studies exploring the links between sleep and adverse outcomes do not allow for the identification of causal links, due to being based on associative or predictive relationships between variables. However, the breadth of the potential negative outcomes that have been linked to poor child sleep clearly suggests that sleep is an important factor for a range of aspects of child development and functioning. However, additional research is required to fully elucidate causal relationships or pathways between child sleep and its outcome on child development and functioning.

Association between child sleep problems and parent and family functioning

In addition to adverse outcomes for the child, poor or disrupted child sleep has been linked to negative outcomes for parents and the wider family unit. Perhaps unsurprisingly, parents of children with poorer sleep also report experiencing poorer sleep quality themselves (Meltzer & Montgomery-Downs, 2011; Meltzer & Mindell, 2007). Poor child sleep in infancy and toddlerhood has been repeatedly linked with parental (predominantly maternal) mental health problems (Bayer, Hiscock, Hampton, & Wake, 2007; Thome & Skuladottir, 2005; Lam, Hiscock, & Wake, 2003; Hiscock & Wake, 2002; Armstrong, Van Haeringen, Dadds, & Cash, 1998). In addition, parentally reported sleep problems in children have been linked to poorer physical and mental health in both mothers and fathers (Martin, Hiscock, Hardy, Davey, & Wake, 2007).

In older children, aged 3 years and above, child sleep quality, somewhat unsurprisingly, significantly predicted maternal sleep quality. However, maternal sleep quality significantly predicted a variety of maternal variables including mood, stress, and fatigue (Meltzer & Mindell, 2007), suggesting a link between maternal sleep quality and other variables. It may be that obtaining good quality sleep protects mothers against other negative aspects. So whilst there is evidence for the secondary effect of poor child sleep on parents and the family unit, the mechanisms and direction of many of these relationships remain unclear.

1.2. Sleep disorders and sleep problems

Adults and children can suffer from a range of disorders and problems with sleep. The range of ‘sleep problems’ tends to cover a number of issues with sleep that are not formally clinically classified. In this thesis, the primary interest is in behaviourally based CSPs, in infancy and pre-school aged children. However, it is important to provide a brief overview of the range and nature of different sleep disorders before moving on to introducing CSPs, which will be the focus of the thesis.

Sleep disorders are diagnosed based on meeting specific clinical criteria. The American Academy of Sleep Medicine (AASM) publishes the International Classification of Sleep Disorders (ICSD), now on its 3rd revision (American Academy of Sleep Medicine, 2014). The ICSD categorises and characterises sleep disorders, as well as providing detailed information regarding diagnostic criteria. The classification categories are split into 6 main groups including: i. *insomnia,* which refers to difficulties in initiating, maintaining or achieving adequate sleep quality that impacts on daytime functioning; ii. *sleep-related breathing disorders,* which represent any breathing difficulties during sleep; iii. *central disorders of hypersomnolence*, which are any conditions that results in excessive daytime sleepiness; iv. *circadian rhythm sleep–wake disorders,* which are any conditions whereby an individual's circadian rhythm is affected and negatively impacts upon their sleep; v. *parasomnias,* which are any disorders where motor or behavioural occurrences take place at sleep onset, during sleep, or on arousal from sleep; vi. *sleep-related movement disorders,* which refer to movements occurring at sleep onset or during sleep. Within each of these main categories there are numerous specific disorders which each have their own symptomology, causes, and diagnostic criteria. An 'other' category is also included, and refers to any form of sleep disorder not encompassed within the aforementioned categories.

Some ICSD classifications of sleep disorders apply to both children and adults, but there are some child-specific sleep classifications. For example, specific sleep-related breathing disorders such as obstructive sleep apnoea and sleep-related hypoventilation disorders have specific paediatric criteria (Zucconi & Ferri, 2014). Therefore, the range of sleep disorders from which children can suffer are broad. While ICSD classifications are used in clinical practice, a range of other criteria for categorising child sleep are commonly used in research, as highlighted in section 1.1.3 and expanded on in section 1.2.1 below.

1.2.1. Child sleeplessness problems

In addition to the wide range of ICSD identified sleep disorders outlined above, there are a wide range of other sleep 'problems' that children can suffer from. These range from difficulties with natural maturational issues (often transient problems that many infants and young children naturally grow out of) to longer-

term, persistent sleep problems. Sleeplessness problems are the most common type of sleep problem in infants and pre-school aged children, most often taking the form of sleep initiation and/or maintenance problems. Initiation problems tend to include difficulties settling a child to sleep, bedtime resistance, or prolonged sleep latency. Sleep maintenance problems tend to include issues such as frequent night waking or early morning waking. While in some cases a child will suffer from one type of problem, in many cases they co-exist.

As there is a breadth of problems with sleep that young children can experience, the general term ‘sleep problems’ is often applied to any form of difficulty or issue. Therefore, child sleep problems can describe problems of a very different nature and with varied symptomology. Consequently, one approach is to consider all problems, issues or causes that result in inadequate, disrupted, poor or unsatisfactory child sleep, both in terms of quality and/or quantity as a CSP. CSPs can take many forms and be experienced in a variety of different ways, but are simply any sleep problem that causes or results in sleeplessness in a child. As a term, CSPs do not suggest any underlying cause of the sleeplessness, but instead simply describe the child’s sleep behaviour symptomatically. It is in this manner that CSPs will be conceptualised in this thesis, and it is specifically these types of sleeplessness problems that are of interest. These types of CSPs can be determined based on both subjective parental report and/or objective assessment.

1.2.2. Prevalence and persistence of child sleeplessness problems

Empirical research suggests that CSPs occur in somewhere between 10-25% of infants and toddlers (Byars, Yolton, Rausch, Lanphear, & Beebe, 2012; Mindell, Meltzer, Carskadon, & Chervin, 2009a; Wake et al., 2006; Armstrong, Quinn, & Dadds, 1994). Other studies have reported prevalence rates of up to 35% for night-waking issues, 42% for settling problems (Johnson, 1991), and 50% for unspecified sleep problems (Hiscock & Wake, 2001). Because many of these studies use different age ranges and population samples to determine prevalence rates, it may not be particularly appropriate to directly compare results. Further, child sleep changes developmentally and many child sleep problems are transient, which may account for the differences in reported

prevalence rates. This is supported by studies that have investigated CSPs at different ages and identified differing prevalence rates across development (Byars et al., 2012; Wake et al., 2006).

In many cases, including the evidence referred to above, the presence of CSPs is determined based on maternal reporting (Byars et al., 2012; Mindell et al., 2009a; Wake et al., 2006; Hiscock & Wake, 2001). As noted in section 1.1.3, subjective reports can be impacted by reporter bias and related to factors other than the child's sleep. However, it is not feasible to obtain epidemiological CSP prevalence data based solely on objective assessments.

Although many parents perceive that CSPs are to be expected and that children will grow out of them in time, evidence suggests many CSPs are persistent rather than transient. A prospective American study suggested infant sleep problems persist in 21% of cases up to 36 months of age (Byars et al., 2012). In Australia, an even higher proportion of mothers (32%) reported their child to have a sleep problem at both 8-10 months and 3 or 4 years (Lam et al., 2003). Therefore, as well as being prevalent, CSPs also appear to be persistent. In addition, child sleep is one of the most common childhood concerns for parents across cultures (Porter & Ispa, 2012; Sadeh, Tikotzky, & Scher, 2010; Trajanovska, Manias, Cranswick, & Johnston, 2010; Mindell, Moline, Zendell, Brown, & Fry, 1994).

1.2.3. Factors associated with child sleeplessness problems

While sleep is a biological behaviour influenced by various internal processes, CSPs are most commonly conceptualised as being complex and multidimensional. They are related, often reciprocally, with various and multiple potential intrinsic and extrinsic influencers and determinants. A brief overview of the most established factors that have been linked to CSPs will be presented below, focusing on those particularly pertinent to this project. However, more extensive reviews are available in other research (Weineraub et al., 2012; Sadeh et al., 2010).

1.2.3.1. Intrinsic factors

There are a range of potential influences on child sleep which are intrinsic to the child themselves. A number of studies have identified a positive link, albeit not always consistent, between difficult child temperament and CSPs compared to children with an easier temperament (Minde et al., 1993; Morrell & Steele, 2003). However, child temperament is commonly classified based on parental report, and as has previously been suggested, there are a range of aspects that may influence parental perceptions of characteristics of their child. Other intrinsic factors which have been linked to child sleep include child age (Petit, Touchette, Tremblay, Boivin, & Montplaisir, 2007), gender (Goodlin-Jones, Burnham, Gaylor, & Anders, 2001; Iglowstein et al., 2003), birth weight (Vergara & Bigsby, 2004; Anders & Keener, 1985), and child attachment (Scher & Asher, 2004; Morrell & Steele, 2003; Scher, 2001), as well as genetic (Fisher, van Jaarsveld, Llewellyn, & Wardle, 2012), medical (Weineraub et al., 2012; Sadeh & Anders, 1993), and developmental conditions (Hodge, Carollo, Lewin, Hoffman, & Sweeney, 2014; Wiggs & Stores, 2004; Wiggs, 2001).

1.2.3.2. Extrinsic factors

A range of potential extrinsic influences on child sleep, have also been suggested.

Parental factors

A well-established link has been identified between maternal depression and poorer child sleep in early infancy (Dennis & Ross, 2005), at 6-months (Karraker & Young, 2007), and in toddlerhood (Morrell & Steele, 2003). However, these links have not always been consistent at later follow up (Morrell & Steele, 2003). Intervention studies have also demonstrated that improving child sleep problems improves maternal depression symptoms (Armstrong et al., 1998). Other studies have highlighted alternate pathways, suggesting maternal sleep deprivation may influence maternal reporting on mental health and/or child sleep (Bayer et al., 2007). So whilst the specific directional links and pathways between maternal depression and child sleep may vary or be bi-directional, the majority of existing research has highlighted an association between these variables.

Other parental factors that have been linked to poorer child sleep include higher maternal separation anxiety (Scher, 2008; Hsu, 2004; Scher & Blumberg, 1999) and maternal avoidant attachment (Cohenca-Shiby & Schonbach-Medina, 2013). Additional parental factors that have been implicated in child sleep will be discussed more comprehensively in chapter 2 due to their relevance to this thesis, include parental knowledge about child sleep (McDowall, Galland, Campbell, & Elder, 2016; Owens, Jones, & Nash, 2011; Schreck & Richdale, 2011; Owens & Jones, 2011; Reich, 2005); parental cognitions about child sleep (Morrell, 1999; Johnson & McMahon, 2008; Tikotzky & Sadeh, 2009; Tikotzky & Shaashua, 2012); and parental bedtime behaviours with their child (Sadeh et al., 2009; Touchette et al., 2005; Morrell & Cortina-Borja, 2002; Adair, Bauchner, Philipp, Levenson, & Zuckerman, 1991).

Other extrinsic factors

Other extrinsic factors which have been explored in relation to child sleep are marital hostility and/or discord (Rhoades et al., 2012; Mannering et al., 2011); broader environmental factors such as socio-economic status and familial home setting (McDonald, Wardle, Llewellyn, van Jaarsveld, & Fisher, 2014; Nevarez, Rifas-Shiman, Kleinman, Gillman, & Taveras, 2010); birth order (Scher et al., 1995; Sadeh & Anders, 1993); child feeding method (Nevarez, Rifas-Shiman, Kleinman, Gillman, & Taveras, 2010; DeLeon & Karraker, 2007; Burnham, Goodlin-Jones, Gaylor, & Anders, 2002); and child-care option (Weinraub et al., 2012; Hauseman, Weinraub, & McCartney, 1993; Jimmerson, 1991).

1.2.3.3. Interaction between intrinsic and extrinsic factors

There has been increasing awareness of potential interactional influences on child sleep. Interest has grown around the interactive role between genetic and environmental factors in child sleep. One area in which genetic and environmental risk factors, individually but also interactionally, have been identified is sudden infant death syndrome (SIDS). For example, specific underlying genetic differences have been identified between healthy infants and infants who died from SIDS, as well as a range of individual environmental risk factors such as infants being aged under 3 months old; non-supine sleeping position; soft bedding; parental smoking; and thermal stress (Carpenter et al., 2013; Hunt & Hauck, 2006; Hunt, 2005). Interactions between these individual

genetic and environmental risks have also been acknowledged (Hunt & Hauck, 2006).

Both genetic and environmental aspects have been highlighted as being influential for infant and toddler sleep (Gregory & Sadeh, 2016). Current evidence appears to suggest that shared environment has a stronger relationship with child sleep than genetics, although genetics appear to contribute modest to moderate additive genetic effects (Gregory & Sadeh, 2016; Fisher et al., 2012; Brescianini et al, 2011; Van de Oord, Boomsma, & Verhulst, 2000). However, other results highlight the fact that genetics may play a larger role in children's overnight, but not daytime, sleep (Touchette et al., 2013). The role of genetics in child sleep also appears greater in older school-aged children (Gregory, Rijsdijk, & Eley, 2006). Recent evidence has also suggested a possible genetic basis or overlap between sleep and many children's psychiatric disorders (Gregory & Sadeh, 2016).

Numerous theoretical models of child sleep acknowledge the interplay between various intrinsic, extrinsic, and environmental factors, and reciprocal relationships (Beebe, 2008; Karraker, 2008; Sadeh & Anders, 1993). The transactional model is an early theoretical model of infant sleep-wake regulation, which clearly highlighted a range of potential intrinsic, extrinsic, and environmental aspects, as well as interaction between these factors, as being influential to child sleep (Sadeh & Anders, 1993). Specifically, intrinsic infant factors such as health, temperament, and development were highlighted. Extrinsic parental factors such as personality, psychopathology, and cognitions, as well as parent-child relationships, interactions, and parenting behaviours, are further highlighted. Finally, the model also emphasises how cultural, environmental, and familial factors may influence parental factors and infant sleep (Sadeh & Anders, 1993).

The model suggests that both intrinsic and extrinsic factors have a direct influence on child sleep, but that it is overactive physical parental bedtime behaviours that have the most direct link to child sleep. Parent-child relationships and interactions are the mediating context of child sleep-wake regulation, and broader environmental, familial, and cultural contexts are a peripheral influence on parental factors and infant sleep. However, the

possibility of interactions, as well as, bi-directional links between some of these factors and infant sleep, are clearly highlighted. Later models have expanded and developed this model (Sadeh et al., 2010; Beebe, 2008; Karraker, 2008). While the subtleties of each model differ, there is a consensus that child sleep involves a complex interplay that includes bi-directional relationships between intrinsic, extrinsic, parental (characteristics and behaviours), and environmental (including social and/or cultural) factors.

Limitations of research into factors associated with child sleeplessness
Across the range of factors that have been considered as having a possible influence on child sleep, in many cases the exact relationship between variables is not always clear or consistent. In addition, in many cases, relationships have been identified based on their association or predictive value, but causality has not been established, meaning that current evidence should be interpreted with caution. It is hoped that future research will continue to elucidate the mechanisms and pathways between variables and their relative impact upon child sleep.

1.3. Management of sleep disorders

The breadth of causes of sleep disorders is reflected in the diversity of approaches to management and intervention. These can be preventative in nature whereby attempts are made to avoid onset or development of a problem. Psychological treatments can also be employed, but generally tend to be based on cognitive or behavioural aspects and predominantly address subjective complaints. Some disorders are most effectively managed with medication, which variously facilitates sleep or wakefulness, or in some cases suppresses particular stages or features of sleep depending on the specifics of the sleep disorder. For sleep disorders with an underlying physical cause, surgery or appliances can be highly effective treatments. The appropriateness of the treatment method generally depends on the specific type of sleep disorder (Abad & Guilleminault, 2003).

There are potential differences in the symptoms and causes of child sleep disorders and CSPs compared to those of adults, and this can also impact the appropriateness of treatment options. While some of the above treatment

methods can be employed, these may be used in different formats when used with children.

1.3.1. Management options for child sleeplessness problems

There are multiple treatment options that can be implemented specifically for CSPs. These range from well-evidenced methods to those with limited empirical support. As our knowledge and understanding of the factors associated with child sleep has developed (as detailed in section 1.2.3), so too has the range of treatment options, and the most recommended methods.

Sleep hygiene

Sleep hygiene is generally understood to refer to a variety of practices that promote healthy sleep. These include practices that encourage good quality sleep, developmentally appropriate sleep duration, and avoid daytime sleepiness. Sleep hygiene practices can span several areas including parental bedtime behaviours; the child's sleep routine; the sleep environment; and daytime activities (Galland & Mitchell, 2010; Mindell et al., 2009a). The introduction of positive sleep hygiene habits can involve simple straightforward changes and are commonly recommended to parents (Mindell & Meltzer, 2008). In many cases, these can be used to support the establishment of good sleep habits in children from an early age, and if not already implemented, are likely to be used as a preliminary approach to improve any CSPs as a first step and/or alongside any other form of treatment option.

Data from a 2004 National Sleep Foundation in America poll suggested links between good sleep hygiene practices and better sleep across a broad age range of 0-10 year olds (Mindell et al., 2009). Despite this, there remains limited experimental evidence in support of the efficacy of sleep hygiene as a standalone treatment method in infancy and toddlerhood. This does not necessarily mean that it is not efficacious; arguably it is a challenging treatment to evaluate. This is primarily because sleep hygiene is commonly an amalgamation of a variety of aspects, and secondly because many parents may have obtained information about good sleep practices and implemented aspects of sleep hygiene independently and/or before any intervention is implemented. Therefore, it is impossible to accurately attribute efficacy to sleep

hygiene alone.

Positive bedtime routines, which form part of good sleep hygiene, are one of the most common components of multi-faceted interventions (Mindell et al., 2006). Empirical evidence, while limited, has demonstrated the efficacy of routines for improving child sleep, maternal ratings of child sleep, and maternal mood (Mindell, Telofski, Wiegand, & Kurtz, 2009). Routines can also be considered to be behavioural in nature due to the stimulus control element. In this sense, appropriate routines encourage positive, sleep-inducing activities and interactions by limiting stimulation or distraction. This helps establish appropriate cues for sleep and consistent age-appropriate sleep and wake times.

Parental education (as prevention and intervention)

Preventative parental education programs seek to educate parents on normal developmental aspects of child sleep and healthy sleep habits, as well as in some cases, informing parents about the aetiology of many CSPs. The rationale behind parental education programs as an intervention is that parents act upon the knowledge gained by making improvements to help improve their child's sleep. Several studies have demonstrated that preventative educational programs can have a positive effect on children's sleep across cultures (Adachi et al., 2009; Kerr, Jewett, & Smith, 1996). In a large-scale review Mindell, Kuhn, Lewin, Meltzer and Sadeh (2006) reported that preventive parental education programs, if delivered prenatally or within the first 6 months, were successful in preventing bedtime and night-waking problems in infants and toddlers. Other empirical evidence suggests that parental education programs can have positive impacts not just on child sleep but also on parental knowledge and behaviours (Jones, Owens, & Pham, 2012; Adachi et al., 2009). Parental education as a standalone intervention method is used less often than as a preventative approach. However, it could be argued that improvements to parental knowledge, understanding, and behaviours promote the use of healthy sleep practices and facilitate improvements in actual child sleep.

Behavioural

In line with the traditional conceptualisation of CSPs being behavioural in nature, the most common and successful treatment options reflect this (Blunden, 2011; Mindell et al., 2006). While there are various adaptations of behavioural treatment methods all follow the principle that CSPs are learnt. Treatment methods are underscored then by principles of learning, whereby undesirable behaviours can be reduced or eliminated by reducing reinforcement, and desirable behaviours can be reinforced and encouraged to occur. Specifically, treatments seek to address and change parents' approaches and behaviours towards their child's sleep in order to help the child develop healthy sleep patterns, habits, and behaviours. There are a variety of types of behavioural interventions, the main forms of which will be briefly described below. Many of these methods are referred to by various titles, some of a formal and others of a more informal nature. The formal titles will be used in the most part, and where appropriate, the informal designations will also be provided for clarity.

Unmodified extinction

Unmodified extinction, which is sometimes referred to as 'cry-it-out' (CIO), requires parents to put their child to bed at a regular set bedtime and not attend to the child until a set time the next day (although parents monitor their child for any signs of injury or illness, and if necessary change the child's nappy with minimal interaction). Parents are required to ignore any crying, screaming, calls, tantrums, or similar behaviours from their child (Mindell et al., 2006). As with many types of behaviourally based interventions, this method seeks to eliminate parental presence and/or attention, which reinforces undesired behaviours (Morgenthaler et al., 2006b). While this method represents extinction in its purest form, other variations of extinction-based approaches have been developed to be more acceptable and easier for parents to implement.

Modified extinction

Modified extinction, which is commonly referred to as 'controlled crying', characteristically involves parents putting their child to bed at a regular set bedtime and subsequently disregarding any child calls, cries, or tantrums, as in unmodified extinction. However, if the child does not settle independently after a

fixed period, the parent returns briefly to calm and settle the child, again with minimal interaction. This is repeated as necessary.

Graduated extinction

Another variation of an extinction based method is graduated extinction, whereby parents put their child to bed at a regular set bedtime and ignore any calling, crying, or tantrums. If the child does not settle independently, parents gradually increase the amount of time incrementally (i.e., 5 minutes, then 10 minutes) before briefly returning to check and settle their child. Again, this is done with minimal parent-child interaction. The time intervals between checking will be agreed between a professional and the parents, and account for various factors such as child age, temperament, and parental ability to withstand their child's cries (Mindell et al., 2006).

Extinction with parental presence

Another variant is graduated extinction with parental presence, sometimes referred to as 'camping out'. While parents continue to put their child to bed at a regular set time and subsequently ignore the child's calls or cries, in this method a parent is present in the room and/or pats or strokes the child until they fall asleep. It is most commonly advised to undertake this method with minimal contact. Parents gradually but systematically withdraw their presence from the room by increasing the physical distance between themselves and their child, until they only check on their child at specified intervals, gradually increasing the timed intervals between checks. The parent refrains from interacting with the child during the checks. Variations on this method include parental presence, but while in the same room as the child the parent feigns sleep.

Faded bedtime with response cost

This method attempts to align the child's set bedtime with their naturally occurring sleep onset time, which may involve moving or delaying the child's bedtime at the start of intervention. The child is put to bed at a set bedtime, and if sleep onset does not occur within a set time, they are removed from bed, again for a pre-agreed time period. This process is repeated until the child is put into bed and rapidly initiates sleep. Once this has been achieved, the child's bedtime is gradually moved to an earlier time, usually by 15 to 30-minute

increments. This continues until the pre-agreed bedtime goal time is attained, or the closest to this bedtime goal that allows the child to fall asleep rapidly. Delaying the child's bedtime allows the child to rapidly initiate sleep, and ensures the cues for sleep onset occur alongside positive interactions between the parent and the child. An age appropriate wake time is agreed and maintained by parents. Other than age-appropriate daytime naps, daytime sleep is avoided.

Scheduled awakenings

In this method, the amount and timings of naturally occurring or spontaneous awakenings is determined. Parents then undertake anticipatory scheduled awakenings around 15 to 30 minutes before a typical natural or spontaneous awakening would be likely to occur. Parents then settle their child back to sleep in the normal fashion as if the awakening had been naturally or spontaneously occurring (Morgenthaler et al., 2006b). Gradually, the scheduled awakenings can be phased out by increasing the duration between the scheduled awakenings.

Cognitive behavioural therapy (CBT)

With growing acknowledgement of the role of cognitions in CSPs, there has been an increasing suggestion that treatment methods should address both cognitive and behavioural aspects. Cognitive aspects of treatment address potential maladaptive cognitions a parent may hold, whereas the behavioural elements (outlined above) aim to alter the parent's behaviour in relation to the child's sleep, and ultimately the child's sleep. It has been suggested that combined treatments would function to change the child's sleep behaviour, while also addressing any relevant problematic cognitions in parents and aiding their compliance and implementation of the behavioural component (Tikotzky & Sadeh, 2010).

Medication

Historically, the most widely used treatment method for treating CSPs were medication-based treatments. Commonly prescribed medications included sleep inducing and sedative types of medication or melatonin, dependent on the type of sleep issue. A large US-based study using data collected between 1993

to 2004 reported that 81% of children under 17 years old who had attended outpatient appointments for sleep problems had been prescribed at least one type of medication for their sleep issues (Stojanovski, Rasu, Balkrishnan, & Nahata, 2007). Similarly, 77% of paediatricians had recommended an over-the-counter medication, and 58% had prescribed medication to children aged 0-13 years of age within the last 6 months (Owens, Rosen, & Mindell, 2003). Both studies suggest that large numbers of children were being prescribed medication for sleep problems. However, infants and toddlers only represented a portion of the age ranges of these samples. Furthermore, these samples included both typically and non-typically developing children, and so this may have impacted the levels of prescription of certain medications.

The efficacy of many drug treatments for CSPs is poor. In a systematic review, while drug treatments appeared efficacious in the short-term, evidence for their success in the longer term was limited (Ramchandani et al., 2000). Further, many healthcare professionals (HCPs) and parents hold a myriad of concerns about pharmacological treatments for CSPs, due primarily to fears about safety, appropriateness, and side effects (Owens et al., 2003; France & Hudson, 1993).

Non-standard treatment methods

In addition to the mainstream treatment methods outlined above, there are a range of other non-standard methods which parents may use. These include herbal remedies, cranial osteopathy, acupuncture, baby massage, and food supplements. The empirical evidence base for these methods remains sparse and inconclusive, and it has been recommended these methods require further study (Morgenthaler et al., 2006b). Nevertheless, as many are anecdotally known to be alternative therapies that may be marketed to or tried by parents, it is important to acknowledge the full range of potential options available. A brief overview of some of the other most common non-standard treatment methods are presented below.

Co-sleeping

While not an intervention per se, some parents may choose to co-sleep with their child as a preferred sleeping arrangement or to ‘manage’ any CSPs. Some

parents who choose to co-sleep do so because they want to adopt a parenting approach that they perceive will allow them to be in close physical contact and highly responsiveness to their child (Ward, 2015), or for the convenience of breast-feeding (Ramos, 2003). However, it is important to make the distinction between parents who make an active decision to co-sleep with their child, also known as intentional co-sleepers, and reactive co-sleepers who do not actively decide to co-sleep with their child but find it is the only option to obtain adequate levels of sleep (Madansky & Edelbrock, 1990). Regardless of the motivation for co-sleeping, there are well-documented risks associated with the sleeping practice, particularly in younger infants of up to 12 weeks old (Vennemann et al., 2012). Evidence suggests that some Western parents co-sleep with their child at one point or another during infancy, most commonly when breastfeeding (Blair & Ball, 2004; Nelson & Taylor, 2001). While there is vast variability in the motivations and incidences of co-sleeping, in Western cultures it is not the most common or preferred sleeping arrangement. In other predominantly Asian cultures, it is a much more widespread practice throughout childhood (Mindell et al., 2010b).

Reviewing child diet

Empirical evidence suggests complex relationships between child feeding and sleep, but it appears that in early infancy formula-fed babies have longer, deeper sleep periods and wake less often than those who are breast-fed and more easily aroused (Horne, Parslow, Ferens, Watts, & Adamson, 2004; Ball, 2003; Eaton-Evans & Dugdale, 1988; Cavkll, 1981). These differences may be due to the challenge infants experience in digesting dairy-based formulas. Yet many mothers think, and some health professionals advise, that feeding formula milk will improve child sleep (Li, Fein, Chen, & Grummer-Strawn, 2008; Cloherty Alexander, & Holloway, 2004). For older infants, it has been suggested that some mothers believe solid foods will help to improve their child's sleep and so introduce these at an early stage, or encourage increased levels of consumption during the day (Alder et al., 2004; Crocetti, Dudas, & Krugman, 2004). However, recent studies have found no empirical evidence for these beliefs; for example, in 6-12 month olds, no difference was found in the number of night-wakings between children who were breast or bottle-fed, and whether

the child consumed solids or not were not linked to the child's sleep (Brown & Harries, 2015). Although children who consumed more during the day required less feeding overnight, they did not wake less than breast-fed children (Brown & Harries, 2015). Therefore, while the effects of changing a child's diet is not clear, reviewing a child's diet may be explored by parents to improve child sleep or in response to CSPs.

No management

Some parents may feel that some characteristics of CSPs, such as difficulty initiating and/or maintaining sleep and experiencing nocturnal or early morning awakenings, are to be expected in childhood. Some parents may therefore choose not to implement any specific approaches to managing their child's sleep, and in the presence of any CSPs simply wait to see if their child naturally outgrows these issues. For example, in response to frequent night-wakings, waiting to see if the child's sleep improves is a viable option for some parents (Meltzer, 2010).

Other parents may choose to adopt a particular parenting style that precludes the use of specific approaches to managing or improving child sleep. Once such style is 'attachment parenting' or 'child-led parenting'. While there are variations of this approach, in the purest form it generally refers to parents adhering to several key principles which commonly include maintaining close physical proximity with their child both in the day and overnight, which is ordinarily achieved by co-sleeping. This method also involves feeding on demand, and avoiding child crying (Attachment Parenting International, 2017; NCT, 2017). Another approach is 'gentle parenting' which, while similar, is not as rigidly based on specified principles as attachment parenting. This approach is often understood to refer to a specific way of parenting that encompasses empathy, respect, and compassion (Gentle Parenting, 2018).

Commonly 'attachment parenting' or 'gentle parenting' approaches advocate parental presence and/or involvement in child sleep. Therefore, implementing behaviourally based sleep interventions, which limit parental presence or involve and the possibility of child distress which may manifest as crying, are ordinarily not condoned. Parents who adopt one of these parenting approaches

may consider that their child will easily settle and/or sleep 'overnight' in their own bed in their own time. Alongside this type of approach there is likely to be the belief that any CSP are likely to resolve spontaneously and unaided.

1.3.2. Efficacy of behavioural interventions for child sleeplessness problems

Intervention studies have demonstrated that sleep can successfully be treated and improved by behavioural interventions in infants and young children (Meltzer & Mindell, 2014; Mindell, Du Mond, Sadeh, Telofski, Kulkarni, & Gunn, 2011b; Minde, Faucon, & Falkner, 1994; Mindell et al., 2006; Morgenthaler et al., 2006b; Ramchandani, Wiggs, Webb, & Stores, 2000). In one rigorous large-scale review of 52 studies of over 2500 pre-school aged children, Mindell, Kuhn, Lewin, Meltzer and Sadeh (2006) found that behaviourally based interventions were efficacious up to 3-6 months post intervention in improving bedtime problems and night-waking in 94% of studies. However, the remaining 6% of studies revealed mixed results.

A small number of studies have raised concerns about possible negative outcomes, for infants and their parents, as a result of implementing behaviourally based methods. For example, the short term stress experienced by children as a result of these methods has been suggested to impact upon the synchrony of maternal and infant cortisol levels, due to a misalignment of infants' physiological and behavioural signals as a result of a behavioural sleep intervention (Middlemiss, Granger, Goldberg, & Nathans, 2012). Although this study has been criticised for the lack of control group, the analysis approach, the fact that assessments took place in an environment (hospital) which was unfamiliar and itself could have caused the infants stress and because the intervention was implemented in a manner which is not typical of most behavioural intervention programmes (i.e. mother was excluded from the settling process). Others have raised concerns about possible implications for parent-child attachment as a result of the use of some particular behavioural interventions (i.e. unmodified extinction) (Blunden, Thompson, & Dawson, 2011).

Such concerns have been refuted by the results of other studies investigating the sequalea of behavioural sleep interventions (although it is worth noting that these studies did not use the unmodified extinction technique, which has been particularly suggested as being harmful). For example, Gradisar et al., (2016) found that behaviourally based sleep interventions were successful in improving child sleep and that these types of interventions were not associated with any negative stress responses as indicated by increased cortisol levels (Gradisar et al., 2016). Similarly, there are reports of a lack of associated adverse outcomes on child emotionality, behaviour or attachment relationships with their mother among others in the short, medium and longer term (i.e. 1-5 years) (Gradisar et al., 2016; Price et al., 2012a).

An important consideration in the debate about the 'effectiveness' of behavioural sleep interventions is that studies have also demonstrated that child and broader familial outcomes can be improved if the child's sleep problem is successfully treated. Addressing CSPs has been associated with improvements in child functioning across a range of domains, including reduced negative daytime behaviours, improved interactions with mothers, improved security, likeability and mood in the form of reduced irritability and emotionality (Eckerberg, 2004; Skuladottir & Thorne, 2003; Minde et al., 1994; France, 1992). Further, positive outcomes have also been demonstrated for parental and familial functioning across domains such as maternal depression, stress, distress, and fatigue levels, as well as improved marital satisfaction (Hiscock et al., 2008; Thome & Skuladottir, 2005; Eckerberg, 2004; Armstrong et al., 1998; Durand, & Mindell, 1990). However, many of the aforementioned studies do not allow for the identification of causal links, not all studies have reported such associated improvements (e.g. Price et al., 2012a), not all potential areas of associated functioning have been explored and further, the generalisability of results from studies where parents have agreed to implement behavioural interventions can be questioned. In addition, the longer-term effects and outcomes associated with different types of behaviourally-based techniques remain under studied and require further empirical examination.

In view of the limitations with existing evidence it is impossible to categorically conclude whether behaviourally based interventions are associated with longer-

term benefits or negative outcomes. However, due to the evidence base supporting the efficacy of these methods for resolving CSPs, at least in the short-term, they are commonly the preferred first-line treatment for health services (Wilson et al., 2010). In addition, empirical evidence highlights the importance of addressing CSPs by suggesting that sleep problems in children are associated with poorer behavioural and emotional functioning later in life (Gregory et al., 2004; Gregory & O'Connor, 2002).

While appropriately implemented behaviourally based methods have a clear evidence base for treating CSPs, there are additional factors which may influence whether behavioural interventions are appropriately recommended, successfully implemented, or even attempted by some parents. A brief outline of the key factors is provided below.

Firstly, some families may avoid attempting any behaviourally based method due to negative perceptions regarding the underlying principles (Tse & Hall, 2008; Lawton, France, & Blampied, 1991; Rickert & Johnson, 1988). For example, if parents wish to follow attachment or gentle parenting principles, behaviourally based interventions may be incongruent with their desired approaches. Some clinicians, HCPs, proponents of specific parenting approaches, and parents themselves have suggested that the distress and possible crying involved in behaviourally based techniques is emotionally, physiologically, and in some cases, physically damaging to the parents and/or child and their relationship (Blunden et al., 2011). However, empirical evidence suggests there are no long-lasting harms to children or parents caused by behavioural interventions (Price et al., 2012a; Sadeh, Mindell, & Owens, 2011).

Secondly, due to perceived challenges of the methods some families may avoid them, or in other cases families may try out the methods but find they are either unable to stick to the required behavioural consistency or that they are impractical for their family (Tse & Hall, 2008; St James-Roberts, 2007; Lawton, France, & Blampied, 1991; Rickert & Johnson, 1988). In addition, the methods can involve potential post-extinction response bursts (PERB), which can, during treatment, see an increase in the initial problematic behaviour which required treatment in the first place (Mindell et al., 2006). PERBs can manifest as crying,

as the child signals for parental attention, and can be negatively perceived by parents (Tikotzky & Sadeh, 2010; Mindell et al., 2006). This may further impact upon the practicality or appropriateness of the method in specific family circumstances. For example, behaviourally based methods may not be suitable if any child crying disturbs other family members such as other children and/or spouses (Etherton, Blunden, & Hauck, 2016; Tse & Hall, 2008; Owens, Palermo, & Rosen, 2002; Rickert & Johnson, 1988).

Parents' own functioning may also influence their desire or ability to implement potentially challenging interventions, which require them to resist their child's demands. For example, if parents are sleep deprived or suffering from mental health problems such as depression, they may be less likely or able to manage the demands of these types of interventions (Etherton et al., 2016).

In addition, a potential challenge, which has previously received little attention is that there can be a difference between parental and HCPs priorities and personal views about how best to manage or treat CSPs. If views are conflicting, this may negatively impact upon how parents regard the information they receive from HCPs, the likelihood of parents implementing any information they receive, and also potentially their future use of HCPs as sources of information or intervention methods (Etherton et al., 2016).

Therefore, while behaviourally based methods have a strong evidence base for improving child sleep, not all parents may want to or be capable of successfully implementing these types of sleep interventions (Tse & Hall, 2008). Evidence suggests the reasons for this may be broad, but may result in parental resistance towards, or non-compliance with, the method.

1.4. Chapter summary

This introductory chapter has reviewed aspects of normal adult and child sleep, and considered the function of sleep by examining current theories and empirical evidence. Different assessment methods were presented along with some of the challenges and limitations associated with the range of different assessment methods available. The specific developmental role of sleep in

children was considered, as well as the range of adverse effects that have been associated with not obtaining adequate sleep.

The next chapter will introduce literature relevant to aspects of parenting which are pertinent to the specific research questions of the thesis: parental help-seeking behaviours and the influence of parenting factors, with a focus on parental bedtime behaviours and cognitions, and their role in child sleep.

Chapter 2

Introduction: Parents and child sleep

The purpose of chapter two is to introduce and provide an evaluation of the background literature on the topics central to this thesis, and to provide a rationale for the research questions addressed. The first section will introduce parental help-seeking behaviours, including the presentation of relevant evidence from the UK and further afield, as well as limitations of this existing research. The proceeding sections will introduce literature relating to parental influences on child sleep. Specifically, section two will discuss the role of parental bedtime behaviours in child sleep. Potential implications of agreement or disagreement within the parental dyad about bedtime behaviours will also be considered. Section three will review literature relevant to the role of parental cognitions in child sleep. Section four will explore the relationship between parental cognitions and bedtime behaviour in relation to child sleep. Limitations of previous research will be identified. Chapter two will conclude with a summary of the evidence, and presentation of the aims and objectives of the two research projects which make up this thesis, including a list of the specific research questions.

2.1. Parental help-seeking behaviours

Parental help-seeking behaviours include where parents go (sources) to seek advice, information, or help in relation to their child. There are a variety of different situations in which parents may seek 'help'. For example, this may range from parents seeking general information about a topic (e.g., information about normal child sleep at a certain age) to seeking advice or guidance (e.g., for a specific aspect of their child's sleep behaviour). Parents may also actively seek treatment or intervention help (e.g., for a specific sleep problem or issue associated with their child's sleep).

To fully appreciate parental help-seeking behaviours, it is important to understand what information parents want and find most useful for different issues as highlighted above, as well as at different developmental stages. It is also necessary to understand why parents may or may not seek information or additional support for any concerns relating to their child's sleep. Also relevant are underlying parental preferences and barriers for using certain sources for advice, information, and/or help. Therefore, in the current thesis, parental help-seeking behaviours are conceptualised to encompass how, when, where, and what parents seek in relation to their child's sleep.

Where can parents go?

There is an array of sources that parents can and do access for information, advice, and help for child sleep. Commonly these include Healthcare Professionals (HCPs), such as doctors, Health Visitors (HVs) and midwives among others and more informal sources such as friends, family, and other parents, as well as the Internet, online forums, child and parenting groups, and books (Tsai, Hu, Lee, & Wu, 2014; Henderson, Motoi, & Blampied, 2013; Stremler et al., 2013; Porter & Ispa, 2012; Brady & Guerin, 2010; France, Blampied, & Henderson, 2003). Research has suggested that parents commonly use a range of sources simultaneously to seek information relating to their child's health (Khoo, Bolt, Babl, Jury, & Goldman, 2008), and specifically for child sleep (Tsai et al., 2014). It is likely that parents may use a multitude of sources at any one time or another during the course of their child's development.

Many studies in this area have attempted to identify parental help-seeking behaviours by documenting either the actual, or clinicians' perception of, proportions of parents who had attended clinics or sought advice from HCPs (with a focus on parents' use of paediatricians and doctors) for their child's sleep (Blunden et al., 2004; Owens, 2001; Morrell, 1999; Mindell et al., 1994). However, this emphasis on parents' use of HCPs or clinics perhaps under-represents both the proportion of parents who seek help and how they approach doing so. For example, this does not take into account parents who make use of other more informal sources, which have not been documented in the same way. Therefore, to fully understand parental help-seeking behaviours, it is essential parents' usage, perceptions, and experiences of different sources, as well as the possible benefits and limitations of different types of sources, are understood.

The Internet is a specific type of informal source that has seen increased use and popularity over recent decades for health-related searches, including parental use in relation to child health (Fox, 2011; Allen, 2000). Internet use is widespread and generally perceived as useful to parents, due to the broad availability of advice, experience, and potential solutions, as well as reassurance and social support (Tsai et al., 2014; Porter & Ispa, 2012; Brady & Guerin, 2010; Plantin & Daneback, 2009). However, what is available via more informal source types, such as the Internet, is not always evidence-based and therefore the quality or appropriateness for each individual case is often unclear. While some sources may offer valid and reliable content and suggestions, others may provide inappropriate or contradictory information (Porter & Ispa, 2013; Scullard, Peacock, & Davies, 2010). Parents appear to recognise this potential limitation of informal sources, and commonly report concerns about the reliability, accuracy, and safety of information gained from the Internet (Pehora et al., 2015; Chung, Oden, Joyner, Sims, & Moon, 2012).

The breadth of sources and information available to parents for child sleep, both online and more generally, has the potential to benefit parents by allowing them to access a range of different ideas, information, or perspectives. Although, this breadth of sources may also pose a challenge for some parents, as exposure to

a multitude of ideas, opinions, and approaches to child's sleep, many of which may be polarizing or contradictory in their nature, could be confusing. In addition, if the reliability of information is not clear, parents may also obtain inaccurate or conflicting information. This may cause parents to feel concerned or frustrated about what information is correct or which approach is most appropriate (Porter & Ispa, 2012; St. James-Roberts et al., 2006; Ramos & Youngclarke, 2006).

2.1.1. Evidence relating to parental help-seeking behaviours

Whilst the range of sources available to parents for information, advice, and treatments for their child's sleep is diverse, very little is known about parental help-seeking behaviours in relation to infant and toddler sleep. Previous research has conceptualised help seeking in many different ways, and typically dealt with the topic as part of broader studies or in very specific cross-cultural settings (Morrell, 1999; Tsai et al., 2014; Stremler et al., 2013). Yet as detailed in section 1.1.3.1, social and cultural contexts can influence expectations and interpretations of child sleep. Therefore, when considering how parents approach seeking information or help for their child's sleep, it is imperative to consider the broader context and generalisability of findings to other locations or cultures. The current thesis focuses on the United Kingdom (UK), however due to the paucity of UK-specific evidence this will be supplemented with evidence from outside of the UK.

Parental help seeking in the UK

There has been limited investigation into parental help-seeking behaviours in the UK. As part of a wider study, Morrell (1999) explored maternal advice-seeking behaviours in 150 mothers of 13-16 month olds by recording if they had previously sought professional help for their child's sleep. In both the mothers of children who had a maternally perceived sleeplessness problem (i.e., the mother simply reported their child to have a 'sleep problem') and those who met a research definition of sleeplessness (i.e., based predominantly on frequency and duration of problematic sleep events), only just over 40% of mothers had sought help or advice from professional sources such as doctors or HVs. However, in both groups (children who had a maternal or research definition child sleeplessness problem [CSP]), higher proportions of mothers desired help

than had sought help (Morrell, 1999). What is not clear is why some mothers had not sought professional help. It may be that help was sought from sources outside of HCPs, and that these were the sole focus of the study.

There are some key limitations to this study that need to be highlighted. Firstly, the mothers included had children in a narrow age range, which may not reflect the help seeking behaviours of mothers of younger and/or older children. In addition, the sample is comprised of predominantly white respondents. It is possible then that results may not generalise to other geographical, culture or child age range groups. However, due to the dearth of literature exploring parental help-seeking behaviours in the UK it is appropriate to refer to the only study which has explored UK parents' help seeking in relation to infant and toddler sleep, whilst acknowledging that there remain significant gaps in existing knowledge regarding parents' help-seeking behaviours.

Parental help seeking outside UK

There has been a larger, but still limited, focus on parental help seeking in other countries and cultures. Previous research paints a contradictory picture of parental help-seeking behaviours, which appear to differ across cultures. In Taiwan, Canada, and the USA, maternal preferences were for informal sources over professional sources (Tsai et al., 2014; Stremler et al., 2013; Johnson, 1991). Mothers tended to value other parents' experiences and suggestions over evidence and professional advice (Pease, 2015; Tsai et al., 2014).

Conversely, in New Zealand and Australia the preference was for professional healthcare sources of Child Health Care Nurses (comparable to UK HVs) and maternal and child health centres respectively (Henderson et al., 2013; Trajanovska et al., 2010). These differences may be the result of cultural or service disparities. Children in these studies ranged in age from early infancy to toddlerhood, and so an alternative explanation may be that parents exhibit age-specific help-seeking behaviours or utilise different sources across their child's development. Furthermore, it may also be that parents seek information about a specific aspect of child sleep at specific points in development when new concerns or child sleep-related behaviours arise.

Similarly to Morrell's (1999) finding, many first-time mothers of young infants in Taiwan, and mothers of older 4-16 years old in Australia, did not directly seek professional help, or delayed seeking assistance even if they perceived their child to suffer from CSPs (Tsai et al., 2014; Blunden et al., 2004). However it is important to note that these results come from very different studies which both have their own limitations. The first study was qualitative in nature and included only twelve Taiwanese first-time mothers. While this provided rich and detailed interview data there is the possibility this small sample of mothers in a specific cultural setting is not representative or generalizable to all mothers and/or across cultures (Tsai et al., 2014). In addition, the Blunden et al. (2004) study, while based on a large sample of over 360 parents, included those with children aged 4.5-16.5 years old and this broad age range may not allow specific developmental trends regarding how parents seek help to be identified or may not be directly representative of parents of younger children. However, the crucial point, relevant to both of these studies, is that it is not clear from existing research how or from where parents who do not seek professional assistance obtain advice, guidance, or treatment, nor their perceptions of the sources they use.

Whilst there are some broad similarities in parents' help-seeking behaviours across cultures, there are also a number of differences which appear to be particular to individual locations, cultures, or the age of the child. This may partly be since different countries have different attitudes towards child sleep, as well as differences in the provision of health services, resources, and informal networks to advise or help parents.

2.1.2. Difference between what help is available and what is used by parents in relation to child sleep

Taken together, evidence from the UK, Australia, and Taiwan suggests there is a difference between what help is available to parents for child sleep and what is used (Tsai et al., 2014; Blunden et al., 2004; Morrell, 1999). However, little is known as to the reasons for this apparent difference. One explanation is that parental decisions to seek or not seek professional information or guidance may be based on many reasons beyond the child's sleep behaviour. Some parents who do not seek help may choose to adopt a 'wait and see' approach based on

the assumption their child will naturally grow out of any problematic sleep behaviour (Owens & Mindell, 2011). Hence these parents may not see the need for employing assistance from healthcare sources. Other parents may hold a preference for informal source types, or in other cases are not aware of the types of professional help or sources that are available to them (Tsai et al., 2014). Alternatively, some parents may not be comfortable acknowledging that they require assistance for their child's sleep, or that their child suffers from a CSP, for fear of being judged or perceived as a 'bad' parent (Netmums, 2016; "Third of parents lie over children's sleep", 2012). To fully understand parental help-seeking behaviours and ensure that appropriate resources are available, it is essential to understand parents' motivations and preferences, along with barriers to the use of sources including those who seek professional guidance, as well as those who follow other routes.

2.1.3. Parental barriers to seeking help and source use for child sleep

In addition to exploring where parents report going for information and help for child sleep, there has also been, albeit limited, an exploration into specific barriers that may inhibit parental help seeking. These include factors internal to the parent and those relating to the source itself, which are outside of parental control.

Internal parental factors as a barrier to seeking help or using sources

Prior to seeking help, parents need to be able to recognise problematic child sleep behaviour, which would likely be based upon the extent of their knowledge and understanding about child sleep**.** There has only been minimal investigation into the full extent of parental knowledge about different aspects of child sleep, and the impact of this knowledge on child sleep, yet this evidence suggests that parental knowledge of child sleep is poor (Owens et al., 2011; Owens & Jones, 2011; Schreck & Richdale, 2011; Reich, 2005). While each of these studies explored large samples of over 150 parents in each study, these studies still have limitations predominantly due to being comprised of convenience samples, which assess knowledge in parents of children from a broad age range. In addition, these studies developed their own assessment measures due to no existing validated measure being available. Therefore, it is

possible that the previously reported results do not apply to more specific age ranges and that any developmental trends in parental knowledge about child sleep have not been identified. Further, comparison of parental knowledge in different samples is hindered by the lack of an established tool to measure this knowledge.

A recent systematic review that included both descriptive and intervention studies also concluded that parental knowledge about child sleep was generally poor (McDowall, Campbell, & Elder, 2016). However, due to the lack of literature in this area only 8 studies were included. In the future, larger reviews may be able to more confidently reach conclusions about level of parental knowledge about child sleep. The authors themselves also conclude that additional research is required in this area. If parents do not possess adequate knowledge or understanding about child sleep they may not be in a position to distinguish between healthy or problematic child sleep behaviour. Therefore, it is likely that only a proportion of parents of children with CSPs would seek professional help. This may result in prevalence rates based on numbers of children being presented to clinical services, as previously highlighted, underestimating the occurrence of CSPs.

Another aspect, which may act as a barrier to parental help seeking, is parental health literacy. This refers to parents' ability to access, understand, and act upon health-related information relevant to their child. Lower levels of health literacy inhibit an individual's ability to access good quality health information and advice, as well as reducing their ability to understand and put into practice any guidance obtained (Berkman et al., 2011; DeWalt & Hink, 2009). There has been a limited investigation into the impact of lower parental health literacy on child sleep, however evidence suggests lower levels of parental health literacy are linked to reduced child night-time sleep duration (Bathory et al., 2016). Further investigation is required to identify the mechanisms underlying the relationship between levels of parental health literacy and child sleep.

Specific maternal characteristics of age and socioeconomic status (SES) have also been highlighted as impacting upon parental help-seeking behaviours. In New Zealand, mothers over 25 years of age were significantly more likely to

seek help than mothers under 25. In addition, mothers from a higher socioeconomic status (SES) were more likely to seek advice than mid SES mothers, who in turn were more likely to seek assistance than low SES mothers (Henderson et al., 2013). However, the focus of previous literature has been based almost entirely on mothers with paternal characteristics being neglected.

There are other factors which have received little empirical investigation that may also need to be considered. For example, parenting experience (e.g., the child's age or number of siblings) or parenting competence may influence what information parents seek, or which sources they use. However, these aspects have not been systematically explored.

Aspects relating to the source as a barrier to parents seeking help or using sources

A key factor likely to influence parents' use of sources for help, information or help with child sleep is the accessibility and availability of the source. These issues may be most pertinent to services requiring an appointment or face-to-face contact (for example HCPs) but could also apply to informal sources such as having access to the Internet or regular contact with family, friends, and other parents. Again, there has been no empirical investigation into UK parents' use, perceptions of, or barriers to using sources for child sleep. Such knowledge is essential to ensure that parents are able to access appropriate sources.

The alignment between parental beliefs or parenting style and the information offered by sources is also likely to influence parental source use. A study of first-time mothers of young infants in Taiwan demonstrated that while there was a clear preference for informal sources, advice from these sources was not always viewed positively or implemented, particularly if it was not in keeping with the preferred maternal parenting style or beliefs (Tsai et al., 2014). In the UK, HCPs provide advice, based upon what is most strongly evidence based. As detailed in section 1.3, these would currently be behaviourally based methods but these are not necessarily attractive to some parents. Delivering only one type of information or intervention method may result in parents feeling they are being instructed on what they should be doing (Middlemiss, 2013).

There are clearly a range of potential barriers, some evidenced and some speculative, to parental use of sources for information and support for child sleep. It remains unclear which barriers are the most influential, or the implications of these barriers on parental help-seeking behaviours.

2.1.4. Parental choices regarding treatment methods

In addition to the wide range of sources that parents have available to them, there is also an array of treatment or management options that parents may choose to implement to improve their child's sleep. Behaviourally based interventions for child sleep demonstrate good efficacy (Mindell et al., 2006). As detailed in sections 1.3.1 and 1.3.2, however, these are only one of a range of possible management options and not all families are able, or want to use behavioural interventions. From a clinical perspective, it is imperative that parents agree with treatment methods, as parents are more likely to successfully adopt practices if they are in line with their beliefs and parenting styles (Nobile & Drotar, 2003). However, very little is known about the differences between those parents and families who are comfortable or averse to implementing behaviourally based interventions, nor between those who successfully implement them and those who do not. Given the ethnic, social, and cultural diversity in the UK, it is highly likely that one type of intervention, such as behaviourally based methods, would not be suitable, acceptable, or appropriate for all families. Yet little is known about UK parents' expectations, opinions, and experiences regarding what is currently available to them or what may best meet their needs.

2.1.5. Implications of understanding parental help-seeking behaviours in relation to child sleep

As highlighted in sections 1.1.5. and 1.2.2. CSPs are common, likely to persist if untreated, and can have a range of adverse effects on the child, parent, and family functioning (Byars et al., 2012; Meltzer & Montgomery-Downs, 2011; Taveraset al., 2008; Bayer et al., 2007; Touchette et al., 2007; Lam et al., 2003; Gregory & O'Connor, 2002). Child sleep and associated problems are a primary concern for parents and are one of the most common worries reported to HCPs across cultures (Porter & Ispa, 2013; Tikotzky & Shaashua, 2011; Trajanovska et al., 2010; Mindell et al., 1994). In addition, there is a vast economic cost and

burden on healthcare resources that has been estimated to be linked to child sleep (Quach et al., 2013; Morris, St James-Roberts, Sleep, & Gillham, 2001). Therefore, it is essential that appropriate information, support, advice and guidance are available to parents. Yet there are apparent gaps in what is known about parents' help-seeking behaviours in relation to infant and toddler sleep. Resources are likely to vary across cultures and countries, and child sleep is likely to be interpreted in line with social and cultural expectations. Therefore, it is essential to understand parental help-seeking behaviours in a specific cultural context, such as the UK, with its own distinct sources, healthcare system, and services, as this has important implications from a practical and clinical perspective.

2.1.6. Summary

There are a variety of potential sources which parents can and do use to seek information, advice, and help for CSPs. However, little is known about the actual help-seeking behaviours of parents in relation to infant and toddler sleep. There appears to be limited understanding about why some parents seek help and others do not. What is clear is that the number of parents who seek help, at least professional help, tends to be fairly low, with greater numbers appearing to desire or need further help than seek it. However, it remains unclear what help is desired, if any, by parents who do not seek formal assistance, and what help they ultimately obtain. The existing literature relating to parental help-seeking behaviours is scant, and in relation specifically to UK parents is virtually non-existent. To provide appropriate information, support, and treatment methods which appropriately meet parental needs, it is essential to understand the full range of aspects such as preferences and barriers as seen by parents in relation to seeking and accessing help. In addition, aspects that are important to parents should be identified. Finally, any unmet needs or gaps in existing resources should be identified to ensure that the provision of suitable advice and help is available to parents.

2.2. Parental bedtime behaviours

Due to the prevalence of CSPs, factors that may influence child sleep have been extensively investigated. This has included the role of parenting and parental factors. One such factor is parental bedtime behaviours, which are any

method or strategy used by parents to settle or soothe their child to sleep at night, or if they wake overnight.

Mechanisms underlying the role of parental bedtime behaviours in child sleep

Models of child sleep suggest that whilst there are clearly fundamental automatic and biological elements of the sleep process there are also some aspects which are learnt (Touchette, 2011; Sadeh, Tikotzky, & Scher, 2010). When learning occurs in relation to sleep it is through a process of association and reinforcement. For example, France, Blampied and Henderson (2003) suggest when a child has developed and learnt healthy sleep associations, the process of sleep reinforces both parental and child behaviour. Infants with healthy sleep self-soothe themselves to sleep both at sleep initiation and if they wake overnight, and this behaviour is reinforced by initiating or resuming sleep. In children who self-soothe, parents are not required to interact with their child, resulting in parental behaviours which encourage infant autonomy, being reinforced in the parent (France et al., 2003).

The process differs in a child who suffers from CSPs, where both parent and child may develop dysfunctional associations between behaviours and sleep. Children who cannot settle themselves may cry or signal, this behaviour, which is reinforced by parental attention and stimulation, as well as sleep onset which will eventually inevitably occur. Parental behaviours that result in child sleep onset will be also reinforced, even though these will likely involve parental involvement in settling and be inappropriate cues for sleep (France et al., 2003). In these cases, a coercive behaviour trap may develop, whereby parental bedtime behaviours reinforce the behaviour of the child who obtains parental attention and parental behaviours, even if these are inappropriate, are reinforced by the child settling to sleep (Patterson, 1982; Patterson & Reid, 1973). Once developed, both the parent(s) and child behave in ways to avoid aversive events; for parents this is to avoid child distress, which often manifests as crying, and for the child this is to avoid initiating sleep in circumstances or environments with which they are unfamiliar. In CSPs, this is commonly settling to sleep without parental presence or involvement (France & Blampied, 1999). These behaviours interact to initiate or perpetuate the child's CSP. Therefore,

parental bedtime behaviours are relevant to CSPs, due to the strong behavioural component of child sleep.

Measures of parental bedtime behaviours

Previous research has predominantly involved asking parents to report the strategies they employ when settling and/or soothing their child to sleep, and the frequency with which they employ different strategies. One such measure is the Parental Interactive Bedtime Behaviour Scale (PIBBS) (Morrell & Cortina-Borja (2002). This was designed, based solely on maternal data from over 250 mothers, to assess the strategies parents employed with their child, and it has been used extensively in a research capacity (Sheridan et al., 2013; Johnson & McMahon, 2008). Five predominant types of parental bedtime behaviours were identified: *active physical comforting,* such as feeding or cuddling; *encouraging autonomy,* which referred to putting a child into bed awake and leaving them to settle themselves; *movement* such as rocking or moving in a pushchair; *passive physical comforting,* which included behaviours whereby the parent is present but avoids touching the child; and *social comforting,* which included behaviours such as reading or talking to the child (Morrell & Cortina-Borja, 2002).

The five factors identified through factor analysis accounted for only 39.1% of the variance of parents' bedtime behaviours. The remaining 60.9% was unexplained variance and so there are clearly other factors, not currently assessed by the PIBBS, which may also need to be identified and considered when understanding parental bedtime behaviours.

A similar measure, the Parent-Child Sleep Interactions Scale (PSIS) (Alfano, Smith, Reynolds, Redd, & Dougherty, 2013), was designed to assess both maternal and paternal bedtime behaviours in older preschool-aged children. Three factors of parenting behaviours related to children's sleep were identified: *sleep reinforcement*, which referred to parents acting to reinforce their child's sleep-related behaviours; *sleep conflict*, which referred to disagreements between parent and child and difficult child sleep-related behaviours; and *sleep dependence,* which referred to children having independence or autonomy issues around sleep. Various associations between these factors and total PSIS score were found with aspects of poorer child sleep. Other studies have

developed questions, scales, or items to assess settling and soothing behaviours specific to their research, or expanded upon the aspects covered by existing questionnaires.

2.2.1. Links between parental bedtime behaviours and child sleep

The exact pattern of results varies from study to study, but previous research has identified associations between specific aspects of parental bedtime behaviour and child sleep. A consistent link has been identified between parental presence at sleep initiation and high levels of parents' involvement in settling, specifically the use of active physical settling methods, with poorer child sleep or CSPs (Mindell et al., 2010a; Mindell et al., 2009a; Sadeh et al., 2009; Tikotzky & Sadeh, 2009; Johnson & McMahon, 2008; Touchette et al., 2005; Morrell & Cortina-Borja, 2002; Adair et al., 1991). The opposite pattern is true for children with 'good' sleep or who had no reported CSPs; parents tend to be less involved in settling, specifically using lower levels of active physical comforting or using bedtime behaviours that encourage the development of autonomy in their child (Sadeh et al., 2009; Touchette et al., 2005; Morrell & Cortina-Borja, 2002). Children put into bed already asleep have also been found to have poorer sleep in comparison to those put into bed when drowsy or awake (DeLeon & Karraker, 2007; Burnham et al., 2002; Anders, Halpern, & Hua, 1992).

Parental bedtime behaviours in early childhood have been linked to concurrent CSPs, as well as to poorer sleep later in life. Maternal presence at infant bedtime was linked to poorer child sleep later in toddlerhood (Cronin, Halligan, & Murray, 2008). Similarly, maternal involvement in infant bedtime behaviours predicted the sleep quality of school-aged children (Sheridan et al., 2013). Therefore, it appears that parental bedtime behaviours can play a role in CSPs across development. Nonetheless, the direction of the relationship is less clear as whilst many studies suggest parental bedtime behaviours to be associated with poorer child sleep, other studies suggest an alternate explanation where CSPs encourage the use of poorer parental bedtime behaviours (Simard et al., 2008).

What types of bedtime behaviours have been related to child sleep?

As in the measures previously described, there has been a predominant focus on the behaviours or strategies that parents use to settle their child to sleep. However, more general parental sleep-related practices and approaches to managing child sleep may also be important. For example, parental endorsement of appropriate bedtime routines, sleep hygiene habits, and child sleep environment have all been shown to be related to better infant and toddler sleep (Mindell, Meltzer, Carskadon, & Chervin, 2009). The sleep-related practices used may also influence the bedtime behaviours that parents employ. Furthermore, sleep-related practices may also be supportive or detrimental to developing healthy sleep habits and, if necessary, supporting interventions to improve child sleep. Therefore, existing literature may have overlooked other aspects of parenting, which may be important to child sleep.

Are parental bedtime behaviours age dependent?

There appears to be a developmental aspect to the bedtime behaviours endorsed by parents, with different strategies being most commonly employed at different stages across development. The most common methods used by parents of younger children appear to be more active or physically involved (Mindell et al., 2010; Morrell & Cortina-Borja, 2002). While some parents utilise methods that seek to encourage autonomy from infancy, many parents perceive that infants require additional parental assistance to settle. This may account for higher levels of active physical comforting in younger children. As children develop and gain independence in other areas, parents' perceptions may change and they may feel that children should not or do not require as much parental involvement in settling. Instead, they may opt to encourage autonomy and self-soothing practices in their child.

Different parental bedtime behaviours have also been associated with poorer child sleep at different ages (Touchette et al., 2005; Morrell & Cortina-Borja, 2002). For example, evidence from Morrell and Cortina-Borja (2002) appears to suggest that parents of children with a CSP endorse higher levels of active physical comforting and settling by movement at age one than at age two. Parents reported higher levels of encouraging autonomy, passive physical comforting, and marginally higher levels of social comforting bedtime

behaviours at age two than at age one in children with a CSP. Further analysis suggested possible explanations for the change in parental endorsement of bedtime behaviours. These included developmental changes whereby parents adjusted their bedtime behaviours in response to their child's age, individual differences in the infant and/or parent, or an interaction between these factors (Morrell & Cortina-Borja, 2002). An additional explanation is that the nature of CSPs or parental expectations about their child's sleep varies at different ages, hence resulting in differing levels of endorsement of bedtime behaviours from age one to two.

Evidence of preventative approaches and intervention studies addressing parental bedtime behaviours

Evidence from intervention studies has revealed that if parents employ methods that seek to encourage autonomy in early infancy and allow children to settle themselves, this functions on the whole to reduce night-waking sleeplessness problems in the majority of infants (St James-Roberts, Sleep, Morris, Owen, & Gillham, 2001; Wolfson, Lacks, & Futterman, 1992). Furthermore, large scale reviews have demonstrated that the most successful interventions for treating CSPs are behaviourally based interventions which aim at reducing levels of active parental involvement or presence in settling their child to sleep (Mindell et al., 2006; Ramchandani et al., 2000).

Evidence for the efficacy of parental education programs in positively changing parental bedtime behaviours is limited, but appears to be positive. Improving parental knowledge through education programs has demonstrated positive effects on parents' intended approaches to their child's sleep (Jones et al., 2012) and actual bedtime behaviours (Adachi et al., 2009). Whilst it appears that education can improve parental behaviours, these studies employed diverse age ranges of children (3 months-12 years) and young infants (4-month-olds followed up 3 months later) respectively, which may influence their generalisability or comparability to specific child ages.

The specific relationship between parental bedtime behaviours and child sleep varies from study to study. However, a link between parental bedtime behaviours that involve extensive parental presence or involvement in bedtime

behaviours and CSPs is well established. High levels of active parental involvement are likely to discourage, or even preclude, the child from developing the ability to self-soothe; hence the association with poorer child sleep.

Parental dyad agreement regarding bedtime behaviours

An additional consideration relevant to parental bedtime behaviours, which has received limited investigation, is the consistency with which parents employ bedtime behaviours. For example, if both parents are involved in the child's bedtime and/or overnight care, are there high levels of parental agreement on the most appropriate bedtime behaviours and are these consistently implemented? Given the strong behavioural element of child sleep, any discordance between parents may be disruptive for the child and could potentially result in poorer sleep. Although level of agreement about parental bedtime behaviours has never been systematically explored in parents of young children, when parental agreement was explored in a broader study in pre-school aged children, higher agreement between parents on how to manage their child's sleep was generally associated with lower levels of CSPs (Lam et al., 2003). Many mothers also report most or all the time agreeing with their partner regarding how to manage their infant's sleep (Bayer et al., 2007). Previous research exploring parental agreement levels have been calculated based on single questionnaire items, and there is clearly scope for more systematic investigation about levels of parental agreement regarding management, and approaches to child sleep and the links with actual child sleep.

2.2.2. Summary

It is well established that parental bedtime behaviours that involve extensive parental presence, active physical involvement, and do not encourage autonomy (and therefore that preclude children from developing the ability to self-soothe), are associated with poorer child sleep (Mindell et al., 2010a; Touchette et al., 2005; Morrell & Cortina-Borja, 2002; Anders et al., 1992; Adair et al., 1991). The transactional model suggests that parental behaviours have the most direct influence on CSPs (Sadeh et al., 2010; Sadeh & Anders, 1993).

Therefore, it is essential to understand the role of both maternal and paternal bedtime behaviours and their relationship with child sleep.

2.3. Sleep and cognitions

Cognitions refer to thoughts, feelings, beliefs, or attitudes, and can represent broad feelings or beliefs towards certain topics, or focus on specific thoughts or attitudes. Cognitions can be held about oneself, aspects of one's own behaviour, or about others. Before presenting research relating to parental cognitions and child sleep, a brief summary detailing the role of cognitions in adult sleep, specifically insomnia, will be provided because understanding the role of cognitions in insomnia has served as a useful model for developing knowledge and approaches to managing this sleep disorder in adults.

2.3.1. Cognitions and adult insomnia

Insomnia is a common sleep disorder, characterised by difficulties initiating or maintaining sleep that occur regularly (even though an appropriate opportunity to sleep is present), and results in daytime impairment. Various risk factors for insomnia have been identified, which include but are not limited to age, gender, and co-existing medical or psychiatric disorders. However, there is also widespread recognition that psychological factors are principal to the disorder (Roth, 2007). Lichstein and Rosenthal (1980) identified that insomniacs more commonly perceived their sleep problems to be the result of cognitive aspects such as a racing mind, worry and challenges managing or controlling their thoughts, than of more somatic aspects such as restlessness or sweating. In the first systematic investigation into the role of cognitions, adult insomniacs reported stronger concerns and more dysfunctional beliefs than self-defined good sleepers, particularly in relation to adverse outcomes of insomnia, loss of power or control over insomnia, and lack of predictability of sleep (Morin, Stone, Trinkle, Mercer, & Remsberg, 1993).

More recent models of insomnia have further highlighted the importance of cognitive aspects in insomnia. One such model was proposed by Harvey (2002), who suggested that several cognitive processes and certain types of cognitions are important. In this model, cognitions are proposed to be experienced as negatively toned cognitive activity, and include dysfunctional or

unrealistic beliefs or excessive volume of thoughts regarding concerns and worries about sleep (Harvey, 2002). Cognitive processes of importance include attention, perception, and safety behaviours. The attention aspect refers to the idea that due to feelings of anxiety surrounding sleep, insomniacs focus attention or have a heightened awareness of sleep-related cues or perceived threats. The perception component refers to the fact that it is common for insomniacs to inaccurately perceive the amount of sleep they obtain. In many cases, insomniacs overestimate the time it takes for them to fall asleep while also underestimating the amount of sleep they obtain. Safety behaviours are behaviours employed by insomniacs to act as a coping mechanism to protect against a negative consequence, most commonly relating to struggling to get to or maintain sleep (Harvey, 2005; Harvey, 2002). An example of how cognitions could be associated with behaviours is that if an individual holds the belief that they are not going to sleep well at night, they may adopt a safety behaviour of napping during the day in order to cope with a perceived lack of sleep at night, and this behaviour then functions to perpetuate sleep difficulties.

A further model of insomnia, which also highlights the role of cognitions in insomnia, is the attention-intention-effort model (Espie, Broomfield, MacMahon, Macphee, & Taylor 2006). This developed Espie's inhibition model (2002) of insomnia. Both models highlight differences in cognitive-sleep processes between those with normal healthy sleep and those with insomnia. The attention-intention-effort model purports that healthy sleep is an automatic process but that in individuals with insomnia, this automaticity is impaired. Specifically, individuals with insomnia will tend to implicitly and explicitly pay attention to and focus on sleep and sleep-related cues. This leads to an explicit intention to sleep, whereby insomniacs specifically undertake behaviours in the hope they will lead to sleep. This explicit intention to sleep develops into sleep effort, which involves an active effort to sleep alongside attempts to increase the opportunity for sleep to occur. Therefore, while acknowledging the possible behavioural components of insomnia, such as specific aspects of behavioural effort to encourage sleep, the cognitive aspects of attention bias, preoccupation with sleep, and the employment of cognitive strategies to help acquire sleep are also clearly highlighted.

While the specific nature of the cognitions and their role in insomnia may differ across models, it is now well established that cognitions are a key component to understanding adult insomnia (Espie, et al., 2006; Harvey, 2002; Morin et al., 1993; Lichstein & Rosenthal, 1980). Further, evidence of the importance of cognitions in sleep is the success of treatments designed to address dysfunctional or maladaptive cognitions. For example, Cognitive Behavioural Therapy for Insomnia (CBT-I) is a successful treatment for adults, specifically aimed at addressing both cognitive and behavioural aspects of insomnia (Morin et al., 1999; Swift et al., 2012).

2.3.2. Parental cognitions and child sleep

Following the recognition of the role of cognitions in adult insomnia, the role of cognitions in child sleep has begun to be explored. Parental cognitions about child sleep could be considered to fall into three categories. Parents may hold cognitions about sleep generally, such as the importance of sleep for healthy functioning. Parents may also hold cognitions about their own sleep such as the amount of sleep they require. Finally, parents may hold cognitions about their child's sleep, which may take a range of different forms, such as expectations of what child sleep behaviour is acceptable or desirable; perceptions of the nature of their child's sleep (good or poor sleeper); concerns about their child's sleep behaviour; and thoughts about how to manage any CSPs. Clearly all of these cognitions may impact upon how parents approach and manage their child's sleep. To date, only parental cognitions related to parental interpretation of CSPs, and how parents approach managing these issues, have been considered. However, it is possible that how parents think about sleep more generally, and/or their own sleep, may have an influence on their cognitions about their child's sleep.

Measures of parental cognitions about child sleep

Research into parental cognitions about child sleep in infants and toddlers has tended to use two main questionnaires. The first is the Maternal Cognitions about Infant Sleep Questionnaire (MCISQ), developed by Morrell (1999). This questionnaire assesses maternal thoughts and feelings about dealing with CSPs in their own child. The measure comprises five subscales which include: *Limit setting*, which represents maternal difficulties in setting limits on their

child's behaviour and/or resisting their child's demands; *Anger,* which represents negative maternal feelings towards the child; *Doubt,* which relates to maternal feelings of doubt about parenting competency; *Feeding*, which represents maternal concerns about child hunger overnight and feeding as a soothing mechanism; and *Safety*, which signifies maternal concerns about child safety during the night. A total MCISQ score can also be computed where higher total scores represent increased levels of concerns and doubts about child sleep. A modified version, the Parental Cognitions about Infant Sleep Questionnaire (PCISQ) (Sadeh et al., 2007) was adapted, predominantly through minor language adaptations, to allow the assessment of maternal and paternal cognitions.

The second measure of parental cognitions is the Infant Sleep Vignette Interpretation Scale (ISVIS) (Sadeh et al., 2007), which comprises 14 hypothetical vignettes of infants exhibiting difficult night-time behaviour or CSPs and parents rate how the child's sleep may be interpreted. The ISVIS subscales include: *Distress*, representing level of parentally perceived infant distress experienced upon awakening; *Limits*, representing the importance of limiting direct parental involvement in settling to sleep or re-settling if child awakes overnight; and *Temperament*, representing parental perception of the role of a child's temperament in sleeplessness problems regardless of parental intervention.

The conceptual nature of the measures differs from one to another. In the MCISQ/PCISQ, parents rate agreement with statements about child sleep issues based on how they would feel if they were reporting on their own child. However, the ISVIS determines parental cognitions about child sleep based on their rating about how child sleep may be interpreted across hypothetical sleep scenarios. These different conceptual approaches may result in very different types of parental responses. Further, evidence suggests that parental cognitions about setting limits and resisting child demands (MCSIQ/PCISQ) and the importance of limiting parental involvement (ISVIS limits) are highly correlated (Tikotzky & Shaashua, 2012). Therefore, although different in their conceptual nature, these subscales may assess a comparable psychological construct. A handful of studies have employed both measures, which should

mean that any relationships between different types of parental cognitions about child sleep, regardless of the different conceptual approach to assessing these types of cognitions, have been adequately identified (Tikotzky & Shaashua, 2012; Tikotzky, Sharabany, Hirsch, & Sadeh, 2010; Sadeh et al., 2007).

Both questionnaires assess genuine issues and concerns parents may hold about child sleep, albeit in very different way. For example, the way in which parents interpret a child's sleep in the ISVIS may not mirror how they would personally feel about the behaviour if it related to their own child, as in the MCSIQ. In addition, the individual MCSIQ statements and ISVIS vignettes include varying amounts of detail about the scenarios, and this may influence how parents respond. Therefore, any interpretation or direct comparison of findings of the PCISQ and ISVIS must be mindful of the potential underlying differences in how parents report and how reliably the measures assess parental cognitions.

Links between parental cognitions and child sleep

The precise cognitions related to child sleep appear to vary somewhat from study to study. The most consistent link has been identified between parental cognitions which reflect challenges in setting limits or resisting child demands and poorer child sleep, both concurrently and later in childhood (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Sadeh et al., 2007; Morrell & Steele, 2003; Morrell, 1999).

Other types of parental cognitions about child sleep which have also been linked to poorer child sleep include those that reflect parental perceptions that infants experience a high level of distress upon awakening and require parental assistance to settle back to sleep (Tikotzky et al., 2010; Tikotzky & Sadeh, 2009). Interestingly when both objective and subjective child sleep assessments have been employed relationships with maternal cognitions were more consistently identified with subjectively reported child wakings, rather than objective sleep parameters (Tikotzky & Sadeh, 2009). However, as has previously been suggested in section 1.1.3.1, it is possible that factors other than the child's actual sleep influences maternal reports of their child's sleep,

hence it is perhaps not surprising that there may be a different pattern of relationships with maternal cognitions seen for subjective and objective child sleep measures. Parental cognitions which reflect parental feelings of anger towards child demands, concerns about overnight child safety, and doubts about parenting competence have also been found to be associated with poorer child sleep, albeit in a smaller number of studies (Tikotzky et al., 2010; Johnson & McMahon, 2008; Morrell & Steele, 2003; Morrell, 1999).

All of the cognitions previously mentioned in this section refer to parental worries or concerns about specific aspects of child sleep. Conversely, parental cognitions which emphasise the importance of limiting parental involvement in child sleep have been found to be associated with better child sleep (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Tikotzky & Sadeh, 2009).

Not all studies have found consistent relationships between parental cognitions and child sleep. Specifically, evidence suggests these relationships can be influenced by other factors, such as a difficult child temperament (Morrell & Steele, 2003). Another study found that parental cognitions did not have a direct effect on child sleep when considered alongside other pertinent variables, such as parental hardiness and bedtime interactions (Johnson & McMahon, 2008).

A handful of studies have considered both maternal and paternal cognitions. Sadeh, Flint-Ofir, Tirosh, and Tikotzky (2007) found that parents shared a range of concerns including that infants would likely be distressed upon awakening and require parental assistance, doubts about parenting competence, and concerns about child hunger. Parents also shared beliefs about the importance of limiting parental involvement in child sleep. An explanation for these shared cognitions may be that parental dyads share a desired approach to parenting or concerns about their child, and therefore have similar opinions regarding issues relating to how they perceive hypothetical scenarios, or their thoughts about their own child's sleep.

Differences in maternal and paternal cognitions

When maternal and paternal cognitions have been considered notable differences have also been identified. In a large sample of Israeli 96 families (48 controls and 48 where parents had sought help for child sleep problems), two

different measures of parental cognitions were used and Sadeh et al. (2007) identified that in hypothetical scenarios, mothers were more likely than fathers to endorse the belief that infants experienced distress upon awakening and required parental assistance to re-settle. Further, mothers held increased feelings of anger towards their child's demands, and higher levels of concerns surrounding child safety overnight. However, fathers were more likely than mothers to endorse the belief that infant sleep problems, in hypothetical scenarios at least, represented excessive child demands and emphasised the importance of limiting parental involvement.

Differences have also been identified between the types of cognitions that parents hold, which are related to poorer child sleep. In an Israeli sample, maternal cognitions reflecting concerns about infant distress upon awakening and need of parental assistance to re-settle were associated with poorer child sleep. For fathers, concerns about child hunger and using feeding as a soothing mechanism were associated with poorer child sleep (Tikotzky et al., 2010).

Maternal and paternal differences were also seen in how parental cognitions related to the sleep of older school-aged children (Ng et al., 2012). Dysfunctional maternal cognitions about child sleep were associated with maternally reported CSPs, but not objectively measured child sleep. Maternal dysfunctional cognitions were also related to dysfunctional child cognitions about their own sleep. However, no relationships were identified between paternal dysfunctional cognitions and any of the subjective or objective measures of child sleep problems.

What types of parental cognitions have been related to child sleep?

The previous research highlighted above has tended to employ the MCISQ and/or ISVIS measures to seek to assess parental cognitions about their children's sleep. However, there are other types of cognitions that may be held by parents which may be important. For example, parents may hold cognitions about their own sleep, such as thoughts relating to their functioning if they do not obtain an adequate amount of sleep (e.g., if I don't get 8 hours sleep I cannot function the next day). Parents may also hold broader thoughts about sleep in general, such as the nature of sleep and control over sleep (e.g.,

whether it is possible to lose control over one's ability to sleep). These other types of cognitions may influence how parents think and feel, and therefore also influence the cognitions they hold about their child's sleep.

A study of older school-aged children (11-12 year olds) considered maternal and paternal maladaptive or dysfunctional parental cognitions about child sleep (Ng, Dodd, Gamble, & Hudson, 2012). This type of cognition differs from those that have been previously been explored in younger children, as detailed above, and is more comparable to the types of cognitions explored in the adult insomniac literature. Similar types of cognitions may be important for parents of younger children, but have not been explored. In order to further elucidate the relationship between parental cognitions and child sleep it is essential that different types of cognitions that parents may hold are explored. It is also possible that certain cognitions held by parents about their own sleep may be related to the cognitions they hold about their child's sleep. For example, a parent who holds a high level of dysfunctional beliefs or attitudes about their own sleep may be more likely to have increased levels of concerns or worries about their child's sleep. However, such relationships are speculative and remain unexplored.

2.3.3. Summary

The relationship between parental cognitions and child sleep is complex. Studies using different measures and samples, and approaching the topic from different perspectives, have found varying results. Evidence suggests that parental cognitions around difficulties in setting limits on child behaviour are consistently related to poorer child sleep. It also appears that there are distinct differences between mothers and fathers in some, but not all, parental cognitions, as well as the relationship between parental cognitions and child sleep. A thorough understanding of the role of parental cognitions, including considering a range of different types of cognitions, differences between parents, and mechanisms of how parental cognitions may influence child sleep across development remain unclear.

2.4. The links between parental cognitions, bedtime behaviours, and child sleep

Given the well-established links between both parental cognitions and bedtime behaviours with child sleep, as reported in sections 2.2 and 2.3, a handful of studies have sought to explore the interaction and possible collective contribution of these two aspects on child sleep. Cognitions are presumed to influence the way in which parents perceive, behave, and respond to their child and their child's behaviour (Bugental & Johnston, 2000; Miller, 1995). More specifically, parental cognitions may influence how parents behave and respond to their child's sleep, including the bedtime behaviours they employ. Parental bedtime behaviours then have an impact on the child's sleep, predominantly through encouraging or precluding the development of the child's ability to self-soothe.

While the exact relationships and pathways between parental cognitions, bedtime behaviours, and child sleep vary from study to study, a consistent link between parental cognitions and bedtime behaviours are clear. Parental cognitions that reflect difficulties in resisting child demands or limiting parental involvement, and thoughts which emphasise child distress and the requirement of parental support upon awakening, are associated with high levels of parental involvement in bedtime behaviours (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Tikotzky & Sadeh, 2009; Morrell & Steele, 2003).

Maternal cognitions assessed when their child was 12 months old which relate to challenges in setting limits or resisting child demands have also been found to predict parental involvement in bedtime behaviours in later childhood at 4 years of age (Tikotzky & Shaashua, 2012). However, when parental involvement level in bedtime behaviours at 12 months was controlled for in the statistical model, this relationship was no longer significant. This was a follow up study to Tikotzky & Sadeh (2009), which included 71 of the 85 original families who participated. The initial study identified an association between parents who did not emphasise the importance of limiting their involvement at bedtime and poorer subjectively reported child sleep at 6 and 12 months. It is possible that including the same families in two separate analyses may have inflated the

apparent role of parents emphasis on setting limits on child sleep. In addition, both samples were comprised of well-educated mothers and so may not be generalizable to parents with different educational levels. However, given the small number of studies that have explored these links and the fact that both the original and follow up study utilised two widely used measures to assess maternal cognitions as well as assessing both objective and subjective child sleep, the value of these results are emphasised.

In a similar study of 2-5 year olds in Australia, parental cognitions predicted parental bedtime interactions, although bedtime behaviours were the most strongly predictive factor of child sleep (Johnson & McMahon, 2008). Therefore, it appears that parental bedtime behaviours mediate the relationship between parental cognitions and child sleep (Tikotzky & Shaashua, 2012; Sadeh et al., 2010; Tikotzky & Sadeh, 2009; Johnson & McMahon, 2008). Another conceptualisation of this relationship was proposed by Morrell and Cortina-Borja (2002) who suggested that maternal cognitions which emphasised challenges in setting limits or resisting child demands, feeling anger towards child demands, and lacking in parenting competence may impact negatively upon maternal capability to reduce or cease bedtime behaviours involving active physical comforting (Morrell & Cortina-Borja, 2002), this may function to perpetuate CSPs.

While a broad range of variables has been considered, additional factors have also been found to interact with maternal cognitions in predicting the types of bedtime behaviours used. Morrell and Steele (2003) found that maternal cognitions which reflected challenges in setting limits on child behaviour and feelings of anger towards a child's demands, alongside a fussy-difficult infant temperament, influenced the likelihood of parents employing bedtime behaviours which include physical parental involvement.

Longitudinal relationships between parental cognitions, bedtime behaviours and child sleep

In addition to concurrent relationships, some studies have explored the longitudinal relationship between parental cognitions about child sleep, the bedtime behaviours used, and child sleep. For example Tikotzy and Sadeh

(2009) found that maternal cognitions which emphasised infant distress and the necessity of parental assistance to re-settle, assessed in pregnancy that remained present during the first year, were associated with and predictive of increased levels of maternal involvement in bedtime behaviours with their child. Higher levels of maternal involvement at bedtime and overnight were also associated with and predictive of increased subjectively and objectively assessed child night-waking. In another study, parental cognitions which reflected difficulties in limiting involvement in child sleep or overnight, assessed at 12 months, were predictive of higher levels of parental involvement in bedtime behaviours at age 4. In turn, these parental bedtime behaviours were also predictive of poorer child sleep at age 4 (Tikotzky & Shaashua, 2012).

Maternal and paternal cognitions, bedtime behaviours, and child sleep

There has been little research on the relationship between parental cognitions, bedtime behaviours, and child sleep which has included both maternal and paternal data. Tikotzky et al. (2010) assessed both maternal and paternal cognitions and levels of parental involvement in bedtime behaviours, and identified differences between mothers and fathers. Mothers reported more co-sleeping with their child if their cognitions reflected the perception that children who wake at night would experience high levels of distress and require parental assistance to re-settle. Although, both mothers and fathers were more likely to report co-sleeping with their child if their cognitions did not emphasise the importance of limiting parental involvement in their bedtime behaviours (Tikotzky et al., 2010). However, what is not clear from this study is the relative impact of these cognitions and bedtime behaviours on child sleep.

It is important to note that this study was conducted in a culturally specific setting including some parenting dyays where one or both parents had been raised in communal sleeping arrangements (CSA) in Israeli kibbutzim. This may limit the generalisability of these results to different geographical and cultural settings. In addition, child sleep was assessed only by subjective parental reports and as previously mentioned is section1.1.3.1 others factors than the child's sleep may influence such reports. Nevertheless, this study supports the idea that parental cognitions can vary between mothers and fathers and are related to, or may underlie, parental bedtime behaviours and this relationship

requires further investigation.

2.4.1. Summary

Existing understanding of CSPs acknowledges the potential role of both parental cognitions and bedtime behaviours. It appears that parental bedtime behaviours mediate the link between parental cognitions and child sleep (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009). However, the exact relationship or pathways between parental cognitions, bedtime behaviours, and child sleep remain unclear. As highlighted in sections 2.2 and 2.3, only certain types of cognitions and bedtime behaviours have been explored, and these studies have focused distinctly on maternal data. Strengthening our understanding of the relationship between parental cognitions, bedtime behaviours, and child sleep across both parents may alter how CSPs are conceptualised and have clinical implications for developing more targeted interventions.

2.5. Limitations of existing research into parental cognitions, bedtime behaviours, and child sleep

There are several limitations of the existing literature exploring parental cognitions, bedtime behaviours, and their link to child sleep, as reported in sections 2.2, 2.3, and 2.4.

Focus on maternal data

One of the main limitations is the distinct focus on maternal data (Tikotzky, 2017; Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Morrell & Steele, 2003; Morrell, 1999). This precludes an exploration of the potential role of fathers, as maternal data is commonly construed to represent ‘parental’ cognitions and behaviours, even though it is not clear if this is appropriate. In addition, although mothers continue to most often be primary care-givers to children, fathers are increasingly involved in child care (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Arguably, bedtime and overnight may be a period when both parents could realistically be actively involved in childcare, and so both should be included in research on child sleep.

In the small number of studies where maternal and paternal data have been explored, differences between mothers and fathers have been highlighted in both parental cognitions held and bedtime behaviours used (Ng et al., 2012; Tikotzky et al., 2010; Sadeh et al., 2007). This highlights the importance of including both mothers and fathers to help unpick the complex relationships between parental cognitions and child sleep. There remains a lack of literature exploring the role of fathers and their bedtime behaviours. Further, precluding fathers from investigation does not allow exploration of consistent similarities or differences between mothers' and fathers' thoughts about child sleep and use of sleep-related practices, or if any differences impact upon child sleep.

Measurement of child sleep

Child sleep has been assessed, measured, and classified in a range of ways across different studies. While these different approaches to measuring and categorising child sleep are relevant, it poses a challenge to integrating the literature. As the measures and definitions vary in nature, this is likely to impact upon the comparability and generalisability of results. However, given the small body of literature in this area, it is essential to consider all relevant studies even if they assess and measure different child sleep outcomes.

The majority of studies have included subjective measurement of child sleep (Tikotzky et al., 2010; Johnson & McMahon, 2008; Touchette et al., 2005; Morrell, & Cortina-Borja, 2002; Morrell, 1999), yet reliance on these types of measures may not accurately reflect the child's sleep. A small number of studies employed objective methods as a standalone or contributory measure alongside subjective methods to assess child sleep (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Sadeh et al., 2007). Employing both subjective and objective measures contributes to ensuring an accurate account of the child's sleep, and if possible, parental bedtime behaviours are captured, which allows the full extent of the relationship between these aspects can be explored. Interestingly, the most robust associations between parental cognitions and child sleep appear to be when child sleep has been assessed by subjective rather than objective measures (Ng, Dodd, Gamble, & Hudson, 2012; Tikotzky & Sadeh, 2009). It may be that subjective reports are not as reliable as the objective actigraphic assessment used in these studies or, alternatively, that

aspects other than the child's sleep influence parental reports. Parents may inadvertently misreport aspects of child sleep, or as reported in section 1.1.3.1, other factors may also have influenced parental reporting of the child's sleep (Loutzenhiser et al., 2015; Dayyat et al., 2011; Sadeh, Mindell, & Rivera, 2011b**;** Morrell, 1999**).**

Assessment of cognitions and bedtime behaviours

Parental cognitions are, by definition, based on subjective parental report. In addition, parental sleep-related practices are also likely to be determined by subjective parental report measures. While these are the most straightforward method by which to assess these criteria, parents may actively or unintentionally avoid or inaccurately report aspects that they think may be deemed undesirable.

Broad age ranges

The majority of studies have tended to employ broad age ranges and some generalise across age groups (Tikotzky et al., 2010; Mindell et al., 2009a; Sadeh et al., 2009; Johnson & McMahon, 2008; Sadeh et al., 2007). As such, these results may not accurately reflect links between parental cognitions, behaviours, and child sleep, but rather obscure any relationships if there are naturally occurring developmental changes in these relationships. Alternatively, broad samples may not be well defined enough to identify associations between parental cognitions and sleep-related practices if they are age-dependent. Other developmental aspects may also influence parental cognitions and sleep-related practices used with their child sleep, but may not be apparent when broad age ranges are considered.

Another potential issue with utilising broad age ranges is that younger children's sleep habits, routines, and environments are more likely to be dictated by a parent and thus be more easily and accurately reported. However, as children grow older, parents may not be as aware of or as involved in their child's sleep compared to when the child was in a cot or in the parents' room.

Geographical and cultural issues

Existing literature in this area has come from distinct geographical locations,

predominantly Israel (Tikotzky & Shaashua, 2011; Tikotzky et al., 2010; Tikotzky & Sadeh, 2009; Sadeh et al., 2007). A smaller range of evidence has come from Australia (Johnson & McMahon, 2008), Canada (Simard et al., 2008), and the UK (Sheridan et al., 2013; Morrell & Cortina-Borja, 2002; Morrell, 1999). However due to the broad cultural, social, and geographic differences between these countries (and thus potential differences in cultural norms and expectations regarding child sleep), the comparability of evidence and the ability to generalise findings needs to be undertaken with caution.

Methodological designs

Many studies exploring the role of parental cognitions and bedtime behaviours on child sleep are correlational or cross-sectional in design (such as Tikotzky & Shaashua, 2012; Sadeh et al., 2007; Touchette et al., 2005). This precludes the ability to reach conclusions about causality or direction of relationships, although evidence suggests the relationship between maternal and child variables is complex. For example, it remains unclear whether certain parental factors, such as the bedtime behaviours employed or the cognitions held, cause or perpetuate CSPs, or if certain types of parental bedtime behaviours or cognitions are the result of CSPs.

2.6. Gaps in the existing literature

To address the aforementioned gaps, it would be beneficial for research to incorporate both maternal and paternal data, and focus upon a specified child age range to provide the opportunity to identify any age-specific relationships, while also incorporating objective assessments of child sleep. Considering the role of broader parenting behaviours such as sleep-related practices (including sleep hygiene behaviours and sleep environment), as well as bedtime behaviours, alongside cognitions, may also be informative. It would also be helpful to explore whether parental dyad agreement across cognitions and bedtime behaviours impact upon child sleep. Where possible, it would be useful to employ methodological designs, which contribute to our understanding of, or allow for the identification of, causal pathways. Finally, given the social and cultural variations relating to child sleep across different geographical locations and the distinct resources available to parents across countries, it would also be beneficial to explore these variables specifically in a UK context.

2.7. Chapter summary

Chapter two has presented evidence about what is known about parental help-seeking behaviours, both in the UK and abroad. Evidence relating to a number of key factors which have been proposed to influence child sleep, including parental bedtime behaviours, parental cognitions about child sleep, and the links between these variables, was also reviewed. This included a critique of existing evidence and examination of the limitations of existing research. The next section will present the aims and objectives relevant to the overall thesis.

2.8. Aims and objectives

This thesis sought to extend knowledge about two aspects related to child sleep that have not previously been systematically investigated. The first research aim, addressed in study one, concerns the help-seeking behaviours of UK parents in relation to infant and toddler sleep. Previous literature has indicated that a range of factors may be influential to child sleep. It is possible that parental help-seeking behaviours may be influenced by similar factors such as those indicated as influential to child sleep, such as parental thoughts, beliefs, knowledge, and behaviours. However, very little is known about where parents seek information or advice for child sleep, what type of information is most useful to parents. In addition, very little is known about what motivations, preferences, or barriers parents experience when seeking help (generally or from specific sources), or what type of treatment methods are being suggested to them.

The second research aim, assessed in study two, was distinct from the first, and sought to explore a range of parental variables and their role in child sleep. Variables such as parental physical and mental health, parenting competence, parental cognitions, and bedtime behaviours have previously been identified as being important to child sleep. However, additional variables which previous literature appears to have neglected, such as parental cognitions about their own sleep, parental knowledge about sleep, and sleep-related practices were also included in the thesis. To expand the predominant focus of previous research on mothers, this range of variables were explored in both mothers and fathers. Due to the apparent differences in the proportion of children who are

classified as having a CSP depending on which methods are used to assess the child's sleep, both subjective parental report and objective actigraphy methods were used to assess and define child sleep.

2.8.1. Study one

Main Aim (Study one): To investigate the help-seeking behaviours and experiences of parents of infants and toddlers in relation to their child's sleep

The specific objectives were to:

1. Describe the sleep of a 6-36 month old sample and explore any differences between children with and without CSPs (using both a parental and research definition of CSPs)
2. Examine parental knowledge about child sleep and describe any differences in level of parental knowledge between parents whose child met the definition of a CSP (based on a parental and research definition)
3. Investigate and report parental use of sources (e.g., Internet, HV) and types of advice or treatment methods (e.g., medication, behavioural interventions)
4. Describe parental preferences, motivations, and experiences of seeking help and making use of certain types of sources
5. Describe parental barriers to seeking help and making use of certain types of sources
6. Explore why parents may not seek advice, information, or help for their child's sleep
7. Describe improvements to existing sources or resources available for child sleep which are desired by parents

Given the exploratory nature of the research, no specific directional hypotheses were formulated.

2.8.2. Study two

Main Aim (Study two): To explore a range of maternal and paternal factors with a focus on cognitions, knowledge, and practices in relation to sleep (relevant to both their own and their child's sleep), and to identify any differences between mothers and fathers, as well as the role of these factors on the child's sleep.

To address this main aim, specific objectives phrased as research questions were as follows:

1. Are there associations between the objectively assessed sleep of the primary night-time caregiver and their child?
2. Are parental cognitions about their own sleep related to their objectively assessed sleep?
3. Are parental reports of child sleep predictive of objectively assessed child sleep?
4. Are there associations between parental cognitions, knowledge, and practices relating to their own and their child's sleep?
   Three hypotheses were made:
   - That higher levels of dysfunctional parental cognitions relating to their own sleep would be associated with higher levels of parental cognitions relating to concerns and doubts about their child's sleep
   - That higher levels of positive parental sleep-related practices relating to their own sleep would be associated with higher levels of positive sleep-related practices in relation to their child's sleep
   - It was also hypothesised that higher levels of parental knowledge relating to their own sleep would be associated with higher levels of parental knowledge about child sleep
5. Are parental cognitions and sleep-related practices concerning their own and their child's sleep associated with (i) parental reporting of the child's night-wakings and (ii) the child's actigraphically assessed sleep?
   Based on previous literature, three hypotheses were made:

- Increased levels of parental cognitions reflecting challenges setting limits on child behaviour would be associated with poorer child sleep
- Increased levels of parental involvement in bedtime behaviours would be associated with poorer child sleep
- Higher endorsement of bedtime behaviours that encourage child autonomy would be related to better quality child sleep

6. Given the previous lack of exploration of different types of parentally held cognitions and sleep-related practices, there were four variables that required detailed exploration:
   - Parental cognitions about their own sleep
   - Parental cognitions about their child's sleep
   - Parental sleep-related practices relating to their own sleep
   - Parental sleep-related practices relating to their child's sleep

As there was no previous literature on the relationship between these variables, they were explored in two ways, across both mothers and fathers:

6.i. Are parental cognitions about their own and their child's sleep along with sleep-related practices relating to their own sleep predictive of the sleep-related practices they used with their child?

6.ii. Are parental cognitions about their own sleep and sleep-related practices relating to their own and their child's sleep predictive of the cognitions parents hold about their child's sleep?

Following an exploration of the relationship between these 4 variables, the subsequent research question sought to explore which, if any, had a predictive value on child sleep.

7. Are parental cognitions and sleep-related practices relating to their own and their child's sleep predictive of the child's (i) parentally reported and (ii) actigraphically assessed sleep?
8. Do parental mental health, parenting competence, child temperament, and parental sleep-related cognitions and practices (relating to their own and their child's sleep) predict the child's (i) parentally reported and (ii) actigraphically assessed sleep?
9. Does congruence/discordance between mother's and father's cognitions (about their own and their child's sleep) and sleep-related practices (for

their own and their child's sleep) predict the child's (i) parentally reported and (ii) actigraphically assessed sleep?

Additional detail regarding the specific nature of each research question and the methods used are provided at the outset of the appropriate chapters. To aid the interpretation of research questions 6-9, illustrations of the relationship between variables being explored will be presented alongside the results.

Chapter 3

Study one:

UK parental help-seeking behaviours in relation to child sleep

This chapter will provide a brief summary of the previous literature and limitations surrounding research into UK parents' help-seeking behaviours, as described in section 2.1, before explaining the rationale and purpose of this specific research project. This will be followed by the methods and details of the analysis of qualitative and statistical data.

3.1. Introduction

Sleeplessness occurs in somewhere between 10-25% of infants and toddlers (Byars et al., 2012; Mindell et al., 2006; Wiggs, 2009). Parents' have a wide range of sources available to them from which to obtain information, advice, and if required, help for child sleep. The sources available to parents include a range of healthcare professionals (HCPs) such as doctors and Health Visitors (HVs), as well as more informal sources or personal networks such as friends, family members, and other parents. In addition to these face-to-face sources,

parents also have access to a vast array of online resources of both a professional and informal nature, ranging from evidence based NHS and sleep organisations, to widely used online parenting sites and forums. There are also many printed materials including books and leaflets available to parents. While it appears that parents do utilise a variety of sources when seeking information and advice regarding their child's sleep, very little is known about the actual help-seeking behaviours of parents in relation to infant and toddler sleeplessness.

There are also many reasons why parents may seek help. For example, this may range from parents seeking general information about a topic to seeking treatment for a specific aspect of their child's sleep behaviour. However, not all parents seek medical or HCPs guidance, even if they perceive their child to suffer from a sleep problem (Blunden et al., 2011; Morrell, 1999). Although, the reasons why some parents seek help and others who may benefit from additional information, help, or support do not, remain unknown. Previous findings are suggestive of a gap between existing available and utilised help, with higher proportions of parents desiring than seeking help (Morrell, 1999). However, the reasons for this are unclear.

To effectively meet the needs of parents, it is essential to understand why and from where parents may seek help, how they approach seeking information or help, and whether they have any preferences or barriers to where they obtain information or help. Older studies have touched upon advice-seeking behaviour of UK mothers of 13-16 month olds (Morrell, 1999), but no study has systematically explored UK parents' help-seeking behaviours. In addition, to ensure appropriate treatments are available to parents, it is essential to understand parents' opinions and experiences about different treatment options. Understanding parents' help-seeking behaviours has implications for the development of current and future help sources and clinical services. Services tailored to better meet parents' needs would hopefully help to maximise the number of families who can access and benefit from appropriate support.

Therefore, this study investigated the help-seeking behaviours of UK parents of infants and toddlers in relation to their child's sleep using an online questionnaire. This allowed data to be collected from as broad a range of parents as possible, in terms of their parenting practices, geographical UK locations and the different services available for help, and information for child sleep. This enabled the study to address the specific aims that were stated in section 2.8. Due to the exploratory nature of this study, no specific predictions were made regarding UK parents' help-seeking behaviours.

3.2. Study one method

3.2.1. Participants

Parents of children aged 6-36 months completed the online questionnaire. The age group of 6-36 months was selected for study one as a wide age range was desired in order to be able to identify developmental trends that may occur. However, it was important that the sleep of the children included could be broadly thought to be 'similar' in terms of what might be considered to be a 'normal sleep pattern'. Therefore the lower age range was set as prior to this age children's sleep can be disorganised but from 6 months old infants have developed the potential to sleep through the night (Henderson, France, & Blampied, 2011; Henderson, France, Owens & Blampied, 2010). The upper age limit of 36 months was selected as it is common for children within this age range to still experience both day and night time sleep (Acebo et al., 2005).

Data was collected between October 2015 and October 2016. During this period 714 questionnaires were started. After exclusions due to child age (outside of 6-36 months old), parental location (outside of the UK) and questionnaires not completed in full, 266 questionnaires were included in the analysis. Of these, 259 (97%) were completed by mothers. Parents were aged 21-45 years, based on age data provided by 261 parents (M=33.49 years, SD=4.71). Basic demographic details and sample characteristics are presented in Table 1.

Table 1. Basic parental demographic details and sample characteristics (n=266)

Variable		Frequency (%)
Ethnicity		
	White (English/Welsh/Scottish/Northern Irish/British)	232 (87.2)
	Any other White background	16 (6)
	Asian/Asian British (Indian)	5 (1.9)
	Mixed/Multiple ethnic groups (White and Asian)	4 (1.5)
	White (Irish)	1 (0.4)
	Mixed/Multiple ethnic groups (White and Black Caribbean)	1 (0.4)
	Mixed/Multiple ethnic groups (Any other Mixed/Multiple ethnic background)	1 (0.4)
	Asian/Asian British (Chinese)	1 (0.4)
	Asian/Asian British (Any other Asian background)	1 (0.4)
	Missing	4 (1.5)
Education level		
	University degree (bachelors)	95 (35.7)
	University degree (masters)	49 (18.4)
	Further Postgraduate education	59 (22.2)
	College	26 (9.8)
	Vocational training or qualification (including apprenticeship)	21 (7.9)
	Compulsory school education	9 (3.4)
	Missing	7 (2.6)
Occupation		
	Professional and technical occupations	92 (34.6)
	Full time parent	52 (19.5)
	Managers, directors, and senior officials	42 (15.8)
	Administrative and secretarial occupations	29 (10.9)
	Caring, leisure, and other service occupations	18 (6.8)
	Other	14 (5.3)
	Sales and customer service occupations	6 (2.3)
	Student	6 (2.3)
	Skilled trade	5 (1.9)
	Unemployed	1 (0.4)
	Missing	1 (0.4)

The ethnicity of the overall sample was predominantly white British (87.2%). The sample was generally well-educated, with over three-quarters (78.9%) holding a bachelors university level degree or above. Just over half of the sample held managerial, director, senior official, professional or technical occupations, suggesting the sample was of high socioeconomic status (SES).

Parents provided details about their living location and arrangements; these are reported in Table 2. Participants predominantly (65.4%) resided in highly populated areas (towns and cities). Many counties across the UK were represented (n=48), although a large proportion of responses (38.4%) came from four counties in the South of England. Most participants (91.7%) reported living with their partner and child(ren).

Table 2. Geographical location of families and living arrangements (n=266)

Living location		**Frequency (%)**
	Town	116 (43.6)
	Village	70 (26.3)
	City	58 (21.8)
	Rural	21 (7.9)
	Missing	1 (0.4)
Living arrangements		
	With your partner and child/children	244 (91.7)
	Alone with your child/children	11 (4.1)
	With your partner, child, and other family members	8 (3)
	With your child and other family members	1 (0.4)
	Missing	2 (0.8)

Of the 266 children about whom parents completed the questionnaire, 139 (52%) were boys and 127 (48%) girls. The age range of children was 6-36 months (*M*=19.41 months, *SD*=9.26). Due to potential differences in parental help-seeking behaviours and child sleep behaviours based on child age, the sample was split into age groups for some analyses. These age groups were 6-12 months (n=83, 31.2%); 13-24 months (n=98, 36.8%); and 25-36 months (n=84, 31.6%). The age of one child was not reported (0.4%) and so was omitted from group analyses.

Most children (n=162, 60.9%), who were the focus of their parent's responses, were the oldest child in the family, and over one-third (n=98, 36.8%) were the youngest child. The majority of children (n=236, 88.7%) were reportedly born at full term, and the majority were not reported to be taking any medication (n=241, 90.6%), or to have any medical or developmental conditions (n=237, 89.1%), which may have influenced their sleep. A small number of children were reported to suffer from medical or developmental conditions (n=13, 4.9%); these conditions and the medications taken by children are shown in Table 3.

Table 3. Medical or developmental conditions and medications taken (n=266)

Condition (n=13)	**Frequency (%)**
Reflux	6 (2.4)
Allergy (including food and milk)	3 (1.2)
Asthma, Eczema and/or allergies together	3 (1.2)
Asthma	2 (0.8)
Cow's milk protein intolerance	2 (0.8)
Mucus	2 (0.8)
Bronchiolitis	1 (0.4)
Congenital Heart Defect	1 (0.4)
Metabolic disease	1 (0.4)
Nystagmus	1 (0.4)
Occasional Uticaria	1 (0.4)
Sleep Apnoea and Reflux	1 (0.4)
Talipes	1 (0.4)
Medication (n=10)	
Laxatives	4 (1.6)
Vitamins or supplements	4 (1.6)
Inhaler (asthma)	3 (1.2)
Reflux medication	3 (1.2)
Antibiotic	2 (0.8)
Pain relief	2 (0.8)
Aspirin	1 (0.4)
Antihistamine	1 (0.4)
Eczema cream	1 (0.4)
Hayfever medication	1 (0.4)

Parents were recruited through several predominantly online sources:

i. Social media pages were specifically designed for the research project on Facebook and Twitter. These were regularly updated, and posters, adverts, and links were frequently posted to advertise the research. Additional links to resources and posts about the topic of sleep that were relevant to parents of children within the age range for the study were also posted.

ii. Details and online study adverts were advertised via online parenting websites such as NetMums, MumsNet, and Dad.info. Various national and local parenting groups who had an online presence also displayed details of the research and a link to the questionnaire.

iii. The research project was advertised through the Oxford Brookes Babylab social media accounts, and an online advert was also emailed out to all parents on the database with children in the age range appropriate to the study. Oxford Brookes Babylab is an active child research group within Oxford Brookes University, and has developed an extensive database of parents in the Oxfordshire area who have taken part in, or expressed an interest in, participating in child research.

iv. Other individuals (predominantly sleep consultants and experts) and groups who had an interest in the research topic also advertised the research project on their webpages and social media accounts.

v. The final sample of parents were recruited from Facebook (n=156, 58.6%), Twitter (n=29, 10.9%), other (n=20, 7.5%), word of mouth (n=19, 7.1%), Oxford Brookes Babylab (n=16, 6.0%), parenting group (n=14, 5.3%) and online advert (n=9, 3.4%).

3.2.2. Measures

The online questionnaire developed for use in this study assessed: (i) child sleep (ii) parental knowledge about child sleep, and (iii) parental help-seeking behaviours. Demographic and medical information about the child and family were also collected. The measures used in the final version of the questionnaire are detailed below.

Child Sleep - *Brief Infant Sleep Questionnaire (BISQ)* (Sadeh, 2004).

The BISQ is a parentally reported 10 item questionnaire which describes parents' report of child sleep behaviour, including; the amount of time the child spends asleep overnight, and during the day, as well as the average amount of time taken to settle the child, and the number of night-wakings. Parents also report whether they consider their child to have a sleep problem. To reduce the burden on participants, BISQ items were not included if they were covered elsewhere in the questionnaire (e.g., demographic items), were not deemed necessary given the current topics under investigation (i.e., sleep arrangements and sleep position), or if they were not required for scoring to produce the research definition of poor sleep, which is described in full below. In this study, eight original BISQ items were used (see Appendix 1). Minor language adaptations were made to provide additional clarity. In addition, following piloting, minor adaptations were made to the way a time response was reported by parents; in the original questionnaire, time was requested in hours and minutes, but this was changed to the 24hr clock format in the current study. Additional guidance was added for these items to ensure all times were recorded in a standardised fashion, such as, 'please write this time in 24-hour clock format. For example if your child fell asleep at 07.56pm, please write this as 19.56'.

The BISQ is widely used as a screening tool to assess paediatric sleep, and has been validated against data collected via actigraphy and parentally reported daily sleep-diary data (Sadeh, 2004). The BISQ is sensitive to developmental changes in child sleep, and has been shown to differentiate between children with normal sleep and those with clinically diagnosed sleep problems. High test-retest reliability has also been demonstrated (Sadeh, 2004). In the current study, parental response to the question 'Do you consider your child's sleep as a problem?' was used to provide a *parent definition* of poor sleep. Parents responded in one of three ways: 'a very serious problem', 'a small problem' or 'not a problem at all'. Those answering 'not a problem at all' were considered to have a child with parentally-defined good sleep, and those answering 'a very serious problem' or 'a small problem' were combined and considered to represent children who had a parentally-reported child sleeplessness problem (CSP), as has been done in previous studies (Mindell et al., 2010b). A simple clinical or research definition cut-off-score can also be used to determine poor sleepers using three criteria in the BISQ: the child wakes >3 times per night; nocturnal wakefulness is >1 hour; total sleep time is <9hours. Based on these criteria, children were split into groups of good sleepers (exhibiting none of these criteria) or poor sleepers (if they exhibited one or more of the criteria) for data analysis purposes. In the current study, this cut-off-score was used as the *research definition* of poor sleep.

Parental knowledge and understanding about child sleep - *Adapted from Parental Sleep Practices and Attitudes questionnaire* (SPAQ) (Grandner, Gooneratne, & Patel, 2013).

Adapting the SPAQ produced a measure of parental knowledge and understanding about child sleep. The SPAQ evaluates habitual adult sleep practices along with beliefs, attitudes, and knowledge about sleep. The original SPAQ includes 151 items which fall into 16 domains covering: sleep duration, sleep debt, sleep quality, sleepiness/tiredness, coping with sleepiness, coping with acute insomnia, coping with chronic insomnia, activities in bed, sleep environment, sleep knowledge, importance of sleep, impact of external factors on sleep, impact of sleep on daytime functioning, self-efficacy, sleep and health, as well as social norms. Brief definitions of the domains are shown in Table 4.

Table 4. Sixteen domains of original SPAQ

Domain	Definition
Sleep duration	Reported amount of sleep (number of hours) obtained on a normal night
Sleep debt	The calculated difference between their reported sleep need and the amount of sleep obtained
Sleep quality	A measure of sleep quality (e.g., speed of falling asleep, lack of night wakes, etc)
Sleepiness/tiredness	Reported feelings of being sleepy or tired during the day, or un-refreshed from sleep when waking
Coping with sleepiness	The methods used to manage feelings of being sleepy or tired during the day
Coping with acute insomnia	The methods used to manage short episodes of poor sleep or difficulty sleeping
Coping with chronic insomnia	The methods used to manage long-term poor sleep or difficulty sleeping
Activities in bed	The activities or behaviours that may be performed in bed
Sleep environment	The general comfort, light, noise, and temperature of the setting sleep takes place in
Sleep knowledge	**General knowledge and understanding about sleep (including if it has been discussed with HCPs and the appropriateness of behaviours related to feeling tired)**
Importance of sleep	**Awareness of the importance and prioritising of sleep**
Impact of external factors on sleep	**Awareness that factors unrelated to sleep can influence sleep behaviour**
Impact of sleep on daytime functioning	**Awareness of the fact that sleep can affect the quality of everyday life**
Self-efficacy	An individual's sense of belief and control over their own sleep
Sleep and health	Awareness of the importance of sleep to good health
Social norms	The perception of social norms of the participant's own social groups relating to the importance of sleep to good health

Domains adapted for use in the current study are highlighted in bold

To assess parental knowledge and understanding about child sleep in the current study, items from four SPAQ domains (sleep knowledge, importance of sleep, impact of external factors on sleep, and impact of sleep on daytime functioning) were adapted to represent statements about child sleep. SPAQ items were adapted maintaining the integrity of the nature of the original statements. Any changes made were to ensure items were relevant for parents to answer on their child's sleep. For example, 'my work affects when and how much I sleep' was adapted to 'my child's day affects how much they sleep'. Any items deemed inappropriate for child sleep, such as matters relating to driving, commuting, and the importance of sleep for adults or seniors, were omitted. One additional item, 'my sleep is important to my health' (part of original subscale sleep and health) was included due its perceived relevance to parents' knowledge about the importance of sleep for healthy functioning.

As the SPAQ was used to assess parental knowledge about child sleep, the

letter C (referring to child) and K (referring to knowledge) were added for clarity and the acronym SPAQ-C-K will be used hereon in. See Appendix 2 for full breakdown of items included and adapted wordings of the SPAQ-C-K.

The questionnaire was adapted alongside input and guidance from experts in children and families research, as well as child sleep research experts. The final questionnaire included 21 items. As in the original questionnaire, parents rated items on a 5-point Likert scale according to how strongly they agreed or disagreed with each statement (strongly disagree, disagree, unsure, agree or strongly agree). In the current study, the SPAQ-C-K questionnaire was used in two distinct ways. Firstly, individual items were designed to be descriptively interpreted and so were presented descriptively in the current analyses. For practical reasons, the response options were collapsed from a 5-point to a 3-point Likert scale response option for data presentation, to show for individual items whether participant responses reflected disagreement (to any extent), they were unsure or agreement (to any extent).

Secondly, to allow a quantification of levels of parental knowledge, items were examined in consultation with a behavioural sleep expert and, where possible, classified as representing ‘correct’ or ‘incorrect’ sleep-related knowledge (see Appendix 2 for classification of SPAQ-C-K items). This resulted in 10 (7 positive and 3 negative items) of the original 21 items being included in their original 5-point Likert scale response format. Level of agreement with each item was then scored based on the original 5-point Likert scale responses so that strongly agreeing with a positive item generated a score of 0, and strongly disagreeing with a positive item generated a score of 4. Strongly agreeing with a negative item generated a score of 4, and strongly disagreeing a negative item generated a score of 0. All scored items were then summed to produce an overall SPAQ-C-K score for each parent. Higher scores on the SPAQ-C-K indicated poorer child sleep-related knowledge, while a lower score indicated more child sleep-related knowledge.

Parental help-seeking behaviours

As there is no existing tool to measure parental help-seeking behaviours in relation to infant and toddler sleep, a questionnaire was designed for use in this study to allow an exploratory investigation of this area. The process of the questionnaire development is detailed below.

Parental help-seeking behaviours questionnaire development

Initial questionnaire items (n=29) were generated based on themes or topics that were of interest in this exploratory investigation. Previous studies that had explored aspects of parental help seeking in relation to child sleep were reviewed to assist in this initial generation of items (Eisenberg et al., 2015; Stremler et al., 2013; Trajanovska et al., 2010; Bernhardt & Felter, 2004). Questionnaire items were reviewed and refined, in collaboration with clinical and research specialists in the field of sleep, and of children and families. Based on expert feedback, five of the original question items were removed and the remaining items were further refined. This predominantly focused on improving the clarity of the language and, for a small number of items, to reduce their complexity. The revised list of 24 items was piloted with mothers and fathers from two families, with children in the relevant age range considered by the study, as well as reviewed by a varied group of sleep professionals. Further refinements were made again to predominantly simplify items. Supplementary open-ended response options were added to allow parents to provide their own details and opinions in addition to choosing pre-selected options.

Final questionnaire

The final questionnaire comprised of 24 items. Some of the questions were nested and only shown to participants based on their responses to other questions, so the exact number of questions seen by each participant varied depending on their responses. All parents were presented with a minimum of 13 items. The final questionnaire was piloted in an online format both by new participants and those who had previously reviewed it. No further revisions were deemed necessary. See Appendix 3 (sections A, B, and C) for a copy of the final questionnaire.

The parental help-seeking questionnaire addressed the following topics:

- **Parental perception of their child's sleep**

Parents were initially asked 'Do you consider your child's sleep a problem?' with a binary yes/no response option. This initial question was presented to parents to determine which subsequent questions they would be shown. If parents answered 'yes', they were asked an open-ended question to provide additional information about why they felt their child's sleep was a problem for the child, parent, or family.

- **Parents' use of sources**

Parents' previous use of sources for information, advice, or help for their child's sleep was explored in this section. Both multiple-choice and open-ended questions were included. Multiple-choice questions had either binary yes/no response options or provided a list of potential sources that parents may have used previously. In the latter case, parents were asked to select as many sources as were relevant to them. The open-ended questions allowed parents to report, in their own words, why they used certain sources, as well as to provide their opinions and experiences of the sources they had used.

- **Parents' experiences of interventions**

This section sought to identify the nature of intervention approaches that had been suggested to parents, as well as parental preferences and experiences of different intervention approaches. This section included multiple-choice and open-ended questions. The multiple-choice question provided an extensive list of 27 potential intervention methods, and parents were asked to select all the methods that had been suggested to them. For each method the parents selected, three additional questions were displayed: two multiple-choice questions to find out a) if the suggested method had been tried, and b) their perceptions of its efficacy. In addition, there was one open-ended question where parents could describe their overall opinion and experience of individual methods.

- **Reasons parents had not sought help for their child's sleep**

This section was only displayed to parents who answered that they had never sought advice, information, or help for their child's sleep at the start of the questionnaire. Parents were asked, 'If you have not sought advice, help or

treatment why is this?' If parents reported that their child's sleep was not something they had needed help, advice, or support for, they were directed to the next section. However, if parents reported they felt their child had a sleep problem but they had chosen not to seek help, they were presented with a further multiple-choice question to clarify their reasons for not seeking help. Parents were asked to select from a variety of possible reasons why they had not sought advice, help, or support in the past. An additional open-ended question provided parents an opportunity to explain, in their own words, what may have encouraged or stopped them from previously seeking help.

- **Actual and ideal help-seeking behaviours**

This section was displayed to all parents. Differences in the sources that parents reported they did use, given what was available to them, and what they would like to use in an ideal world, were explored. Both multiple-choice and open-ended questions were included. Multiple-choice questions provided a list of potential sources that parents did use or would like to use in an ideal world, and parents were asked to select as many options as were relevant to them. Open-ended questions allowed parents to tell us in their own words the reasons why they would want to use particular sources.

- **Barriers to use of sources**

Parental reservations or barriers to using specific sources were also explored. Based on previous research, and alongside discussion with research experts in the field of sleep, and of children and families, four widely available and commonly used source types for information, advice, and help for child sleep were enquired about. These were HCPs, the Internet, family/friends/other parents, and written information. To ensure no other source types were overlooked, an 'other' category was also included and, if selected, parents were asked to specify the source. These categories were intentionally kept simple, but expansive, to cover the broadest range of source types. For example, HCPs were conceptualised to include doctors, nurses, midwives, HVs, and any other HCP the parent may have come into contact with. This section included open-ended questions to allow parents to report, in their own words, the reasons why they had concerns about using any of the source types.

- **Any other parental comments, thoughts, or experiences about child sleep**

The final open-ended question asked parents to provide any additional information that they felt was important.

Due to the unexpected, extensive amount of qualitative data collected through this questionnaire, the aspects reported on in full in this thesis focus on areas for which there has been very little previous empirical study. Therefore, the reporting focuses upon parents' use of sources, experiences of interventions, actual and ideal help-seeking behaviours, and barriers to use of sources, as well as reasons why some parents had not sought help for their child's sleep.

Demographics

Respondents were asked various demographic questions, including their relationship to the child in question, their age, ethnicity, education level, occupation, geographical location, and living arrangements. These included with whom the respondent and child lived and how many children were in the household. Respondents were also asked to provide information about their child including age, sex, birth order, whether the child was born at full term (if premature, how many weeks), whether their child suffered any current or on-going medical or developmental conditions, and any medications the child was currently taking. Finally, participants were asked where they had heard about the questionnaire.

3.2.3. Data analysis

Missing data

Parents were not obligated to answer every individual questionnaire item, which did result in some missing data. However, given that many of the items required written responses, it was acknowledged that not all parents might have had comments across all aspects of the questionnaire. Data were initially explored descriptively. Any participants who completed the majority of the questionnaire, including demographic questions (which were situated at the end of the questionnaire) were deemed to have progressed through the questionnaire and provided responses where they deemed pertinent. Any questionnaires which were missing large amounts of data, regardless of demographic completion,

were omitted. As most of the data were presented descriptively, missing data were not replaced, and it is clearly noted throughout the results sections where individual items have responses missing or how many individual participants reported a specific theme for qualitative data presentation.

Quantitative

Much of the data is presented descriptively, through tables and graphs, in accordance with the aims of the study. Where differences between groups were explored variables were checked for normal distribution and homogeneity of variance, prior to any statistical tests being performed. Due to not meeting assumptions for parametric tests, Mann Whitney-U tests were run and are reported in the results section denoted by a *U* value.

Chi-square tests were also used to explore associations between categorical variables. Where significant chi-square test results were identified, the standardised residual scores were used to further elucidate the relationship between variables; specifically, which variables significantly contributed to the chi-square test. Standardised residuals represent a ratio of the difference between the observed and expected frequency counts. When ±1.96 these scores were interpreted to represent a significant difference between expected and observed counts. Standardised residuals are displayed as z-scores and denoted with a *z.*

The specific variables and statistical tests run in each case are clearly detailed, as appropriate, throughout the results section.

Qualitative

Qualitative data, collected through open text boxes in the questionnaire, were analysed using thematic analysis following the standardised guidelines developed by Braun and Clarke (2006). This thematic analysis process involves six distinct stages: familiarisation with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and finally producing the written analysis. Thematic analysis was deemed the most suitable analysis method, as it is theoretically flexible approach, which is not bound to any specific methodology and can be used as a standalone method

for analysing data. An inductive thematic analysis approach was employed, whereby themes were derived from the data in a 'bottom-up' approach. Thus, participants' own words were the starting point from which more general themes were developed. To ensure a rigorous approach to data analysis, after the researcher had conducted the initial steps of thematic analysis on the data, a supervisor on the project (JA) reviewed raw data and also generated themes from the first 10 participants' qualitative data. In addition, the first 30 participants' responses (including the same 10 reviewed by JA), which represent 11% of the overall dataset, were reviewed and coded by another supervisor on the project (LW), and also by an additional qualitative researcher who was not involved in the research project (KH). The researchers and supervisors separately discussed and refined the codes and themes generated in the study to reach agreement that the final themes reliably and accurately embodied the detail present in the participants' original data. This approach sought to ensure the quality and credibility of the analysis (Nowell, Norris, White, & Moules, 2017; Barbour, 2001). A brief description and verbatim supporting quotes are reported in the thesis for each theme. The presence of each theme across individual participants' qualitative data was identified so that a frequency count for each theme could be generated. Due to the sample size, this provided an indication of the strength of presence of each different theme across the sample.

3.2.4. Procedure

Ethical approval was obtained through Oxford Brookes University Research Ethics Committee (study number 150932, see Appendix 4 for copy of ethical approval letter). The online questionnaire went live on 29th October 2015. When participants accessed the online questionnaire, they were presented with the full participant information sheet (see Appendix 5). Informed consent (by ticking a box online) was obtained from participants before they could access the questionnaire. It was made clear there were no right or wrong answers, and that the purpose of the questionnaire was to find out more about how parents seek help, advice, information, and treatment options for their child's sleep. Participants could leave the questionnaire at any point. Incomplete questionnaires stayed live for a week, but once this period had passed the questionnaire was closed and listed as a part-completed questionnaire. All

parents who completed the questionnaire and left a valid email address were entered into a prize draw to win a £50 Amazon voucher. During the period in which the questionnaire was live, adverts and links to it were regularly refreshed and reposted both on the research project social media pages and parenting websites, as described in section 3.2.1. The questionnaire was closed on 31st October 2016.

Chapter 4

Study one: Online questionnaire results

This chapter will present the quantitative and qualitative results of study one. Results will be presented sequentially for the three main areas, assessed by the online questionnaire: child sleep, parental knowledge and understanding about child sleep, and parental help seeking in relation to child sleep.

4.1. Child sleep variables

4.1.1. Child sleep questionnaire

A range of child sleep variables were calculated for the sample from the Brief Infant Sleep Questionnaire (BISQ), and are presented in Table 5. As the study included children with a broad age range, BISQ child sleep variables were also considered across age groups: 6-12 months, 13-24 months, and 25-36 months. Results are displayed in Table 6.

Table 5. BISQ sleep pattern variables

	Mean (SD)	Min	Max
Night-time sleep duration (hrs) (n=252)	10.49 (1.29)	5.50	14.00
Daytime sleep duration (hrs) (n=259)	1.63 (0.95)	0	4.50
Total sleep duration (hrs) (n=250)	12.14 (1.62)	5.50	16.00
Bedtime (time) (n=172)	19.63 (0.86)	18.00	23.00
Time to settle (hrs) (n=260)	0.49 (0.52)	0	5.00
Night-waking (number) (n=250)	1.84 (1.81)	0	12
Nocturnal wakefulness (hrs) (n=240)	0.54 (0.68)	0	3.50

Decimalised mean (standard deviation), minimum and maximum values

As they grew older, children's sleep was consolidated to the night-time period and daytime sleep reduced. Children increasingly went to sleep slightly later across the age groups, woke less frequently, and woke for a shorter amount of time over night. Interestingly, there was very little difference in the time it took parents to settle their child to sleep across the age groups, with settling times averaging around 30 minutes for all three age groups.

Table 6. BISQ sleep pattern variables across child age groups

	6-12 months (n=81)	13-24 months (n=97)	25-36 months (n=81)
Night-time sleep duration (hrs)	10.33 (1.45)	10.60 (1.26)	10.51 (1.68)
Daytime sleep duration (hrs)	2.13 (0.90)	1.82 (0.68)	0.88 (0.81)
Total sleep duration (hrs)	12.50 (1.79)	12.44 (1.46)	11.43 (1.43)
Bedtime (time)	19.41 (0.91)	19.65 (0.78)	19.83 (0.87)
Time to settle (hrs)	0.49 (0.43)	0.51 (0.67)	0.47 (0.39)
Night-waking (number)	2.58 (2.24)	1.76 (1.51)	1.20 (1.36)
Nocturnal wakefulness (hrs)	0.76 (0.77)	0.45 (0.58)	0.40 (0.64)

Decimalised mean (standard deviation). A maximum number of 35 responses were missing for any one variable

4.1.2. Presence of child sleeplessness problems

As detailed in section 3.2.2, there were two distinct ways in which child sleeplessness problems (CSPs) could be determined from the BISQ: a parent report and research definition. Figures 1 and 2 show the proportion of children who met parental and research definitions of CSPs across the sample and specific age groups. Perhaps unsurprisingly, the 6-12 month age group had the highest proportion of CSPs.

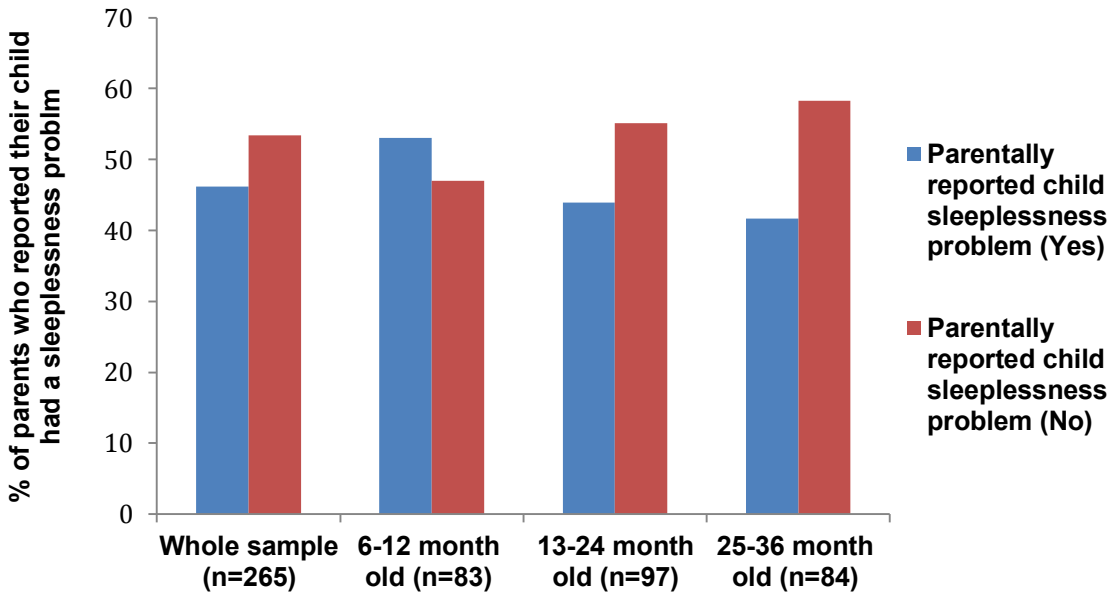

Figure 1. Parent definition: The percentage of children whose parents reported their child had a CSP across the whole sample, and across age groups of 6-12 months, 13-24 months, and 25-36 months

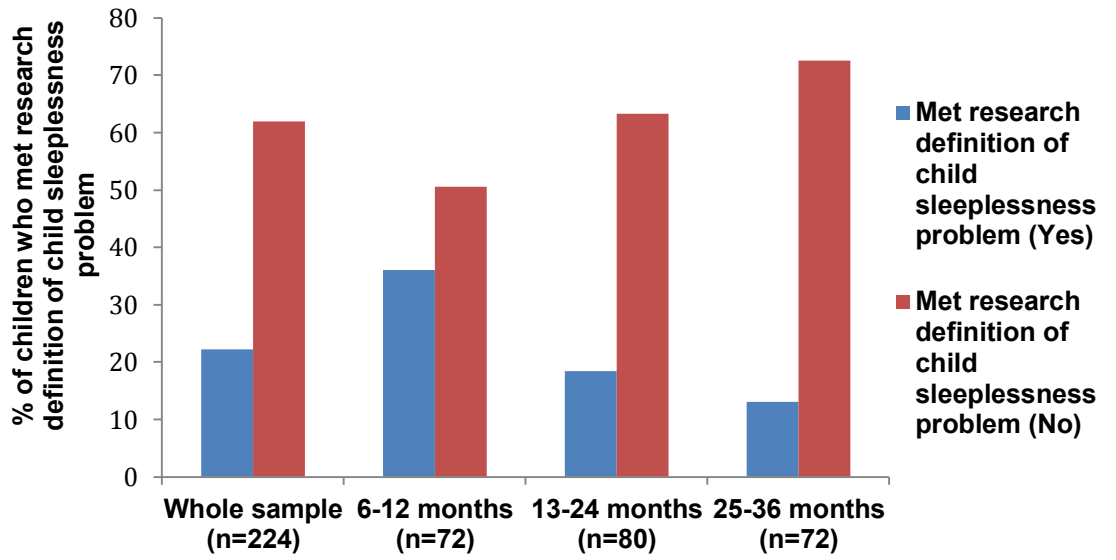

Figure 2. Research definition: The percentage of children who met research definition for a CSP across the whole sample, and across child age groups of 6-12 months, 13-24 months, and 25-36 months

When the parent definition of CSPs was applied, just under half (46.3%) of parents felt their child's sleep was problematic to some extent (original response options 'a small problem' and 'a very serious problem' combined). When the research definition of CSPs was used, 22.2% of children in the sample were classified as having a CSP. The research definition was based on

224 parental responses, as 42 participants were missing one or all BISQ items needed to calculate the research definition, and so were excluded from the analyses. As parental definition of a CSP was determined by combining parents who deemed their child's sleep to be 'a very serious problem' or 'a small problem', the frequency of parents' original BISQ response options are displayed based on if those children also met the research definition of a CSP. Results are shown in Table 7.

Table 7. Comparison between parental and research definition of a CSP

	Research definition of CSP	
	Yes (n=58)*	No (n=165)
Parental definition of CSP		
A very serious problem	12 (5.4)	3 (1.3)
A small problem	29 (13)	57 (25.6)
No problem at all	17 (7.6)	105 (47.1)

Frequency (percentage) of children who met each definition *1 participant missing parental definition of CSP

There were discrepancies between the frequency of parents who defined their child as having a CSP and those who met the research definition for a CSP. Perhaps unsurprisingly, 47.1% of children who were not parentally reported as having a CSP (sleep reported to be 'no problem at all') also did not meet the research definition of a CSP. A small proportion of children (5.4%) met both parental (sleep reported as 'a very serious problem') and research definitions for CSPs. Just over a quarter (25.6%) of children were parentally defined as having 'a small problem' with sleep but did not meet the research definition of a CSP, while 13% of children parentally reported to have 'a small problem' with sleep also met research definition of a CSP. Interestingly, 1.3% of children who were parentally defined as having a CSP (sleep which was 'a very serious problem') did not meet the research definition, and 7.6% of children who were not parentally defined as having a CSP did meet the research definition of a CSP.

4.1.3. Differences in child sleep between those who did and did not meet parent and research definitions of a CSP

To further explore the differences in child sleep between children who did and did not meet parental and research definitions of CSPs, BISQ child sleep variables were calculated across these groups. Due to data not meeting parametric assumptions Mann Whitney U tests were used. The results of these tests and the descriptive statistics are shown in Table 8.

There were significant differences between the sleep of children with and without CSPs when the presence of these CSPs were defined by both parental and research definition. These results suggest that children who were parentally defined or met a research definition of CSP had significantly poorer sleep, across a range of different aspects of sleep, than children who were not reported to have any CSPs.

Table 8. BISQ sleep pattern variables by parental and research definition of a CSP

	BISQ parental definition of CSP*			Meet BISQ research definition for CSP		
	Yes (123)	No (142)	Mann Whitney U	Yes (n=59)	No (n=165)	Mann Whitney U
Nocturnal sleep duration (hrs)	9.95 (1.45) (*Mdn* = 10)	10.95 (0.92) (*Mdn* = 11)	*U* = 4282.50, *z* = -6.24, *p* <.001, *r* = -0.42	9.56 (1.59) (*Mdn* = 10.00)	10.85 (0.94) (*Mdn* = 11.00)	*U* = 2220.00, *z* = -6.27, *p* <.001, *r* = -0.42
Daytime sleep duration (hrs)	1.61 (0.92)	1.64 (0.98)	*ns*	1.71 (0.80)	1.65 (0.98)	ns
Total sleep duration (hrs)	11.58 (1.81) (*Mdn* = 11.83)	12.63 (1.28) (*Mdn* = 12.50)	*U* = 5029.50, *z* = -4.74, *p* <.001, *r* = -0.30	11.27 (1.92) (*Mdn* = 11.50)	12.50 (1.32) (*Mdn* = 12.50)	*U* = 3056.00, *z* = -4.26, *p*<.001, *r* = -0.28
Sleep-onset time (time)	19.57 (0.98) (*Mdn* = 19.50)	19.18 (0.71) (*Mdn* = 19.50)	*U* = 2837.00, *z* = -2.75, *p* = .006, *r* = -0.21	19.43 (1.05)	19.35 (0.84)	ns
Time to settle (hrs)	0.62 (0.54) (*Mdn* = 0.50)	0.38 (0.48) (*Mdn* = 0.33)	*U* = 5687.50, *z* = -4.48, *p* <.001, *r* = -0.28	0.67 (0.53) (*Mdn* = 0.50)	0.44 (0.53) (*Mdn* = 0.33)	*U* = 3017.00, *z* = -4.33, *p* <.001, *r* = -0.29
Night waking (number)	2.47 (2.01) (Mdn = 2.00)	1.29 (1.42) (*Mdn* = 1.00)	*U* = 4549.00, *z* = -5.67, *p* <.001, *r* = -0.36	4.04 (1.93) (*Mdn* = 4.00)	1.14 (1.04) (*Mdn* = 1.00)	*U* = 711.00, *z* = -9.89, *p* <.001, *r* = -0.66
Nocturnal wakefulness (hrs)	0.87 (0.77) (*Mdn* = 0.50)	0.27 (0.46) (*Mdn* = 0.25)	*U* = 2820.50, *z* = -8.11, *p* <.001, *r* = -0.52	1.32(0.84) (*Mdn* = 1.00)	0.29 (0.34) (*Mdn* = 0.17)	*U* = 1047.50, *z* = -9.07, *p* <.001, *r* = -0.61

Mean (SD), median (IQR), and Mann Whitney

4.1.4. Method used to settle children to sleep

The BISQ provides information on how parents most commonly report settling their child to sleep. Results for the whole sample and split by age group are shown in Figure 3.

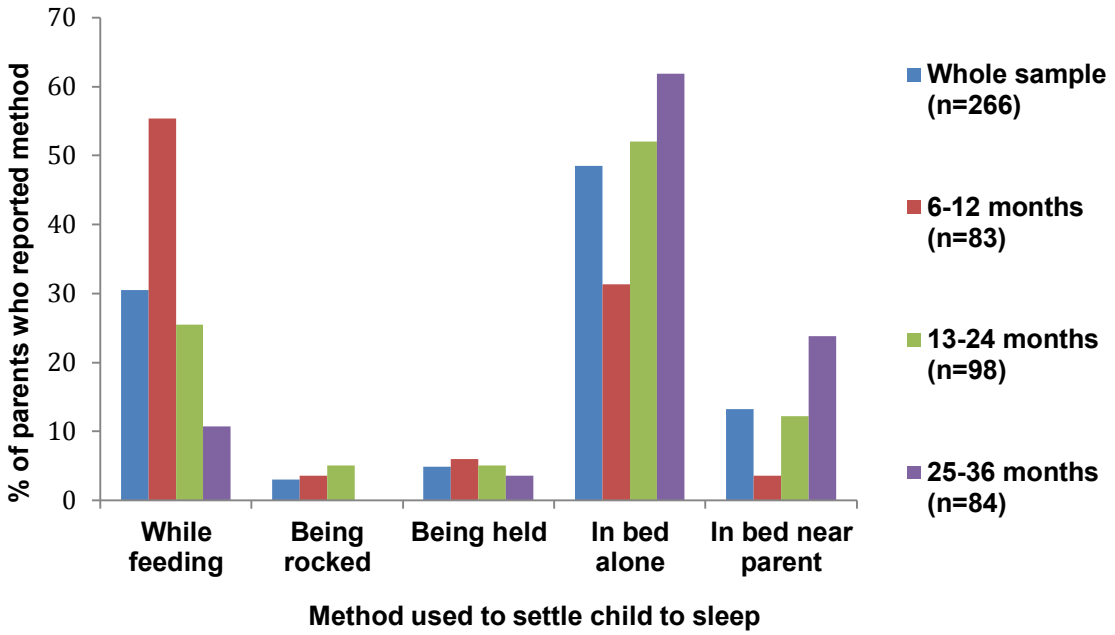

Figure 3. Percentage of parents who settled their children to sleep using different methods across whole sample

The most common settling method across the sample was the child being put into bed alone, however a fairly high proportion of children were also settled while feeding.

The method parents used to settle their child to sleep was explored when the sample was split by parentally defined and research definition for a CSP, results are displayed in Figures 4 and 5 respectively. As seen in Figure 4, children whose parents did not perceive their child to have a CSP were most commonly settled in bed alone. Children whose parents perceived they had a CSP were most commonly settled while feeding or in bed alone.

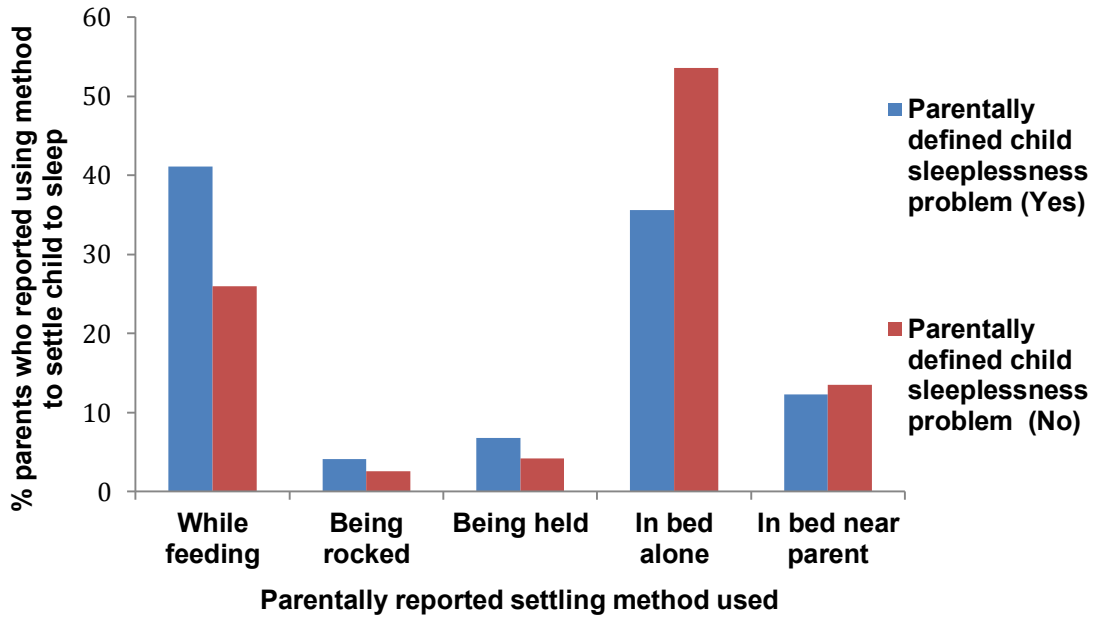

Figure 4. Methods parents used to settle their children to sleep when split by parental report of a child sleeplessness problem

Chi-square tests indicated there was a significant association between how parents settled their child to sleep and if the child was parentally reported as having a CSP, $X^2(4,N=265)=17.57$, p = .001. Table 9 shows the observed frequency and percentage count of each settling method across children with and without a parentally defined CSP. Examination of standardised residuals suggests that significantly more children who had a parentally reported CSP were settled in bed near parent (z=.2); conversely, significantly fewer children who did not have a parentally defined CSP were settled in bed near their parent (z=-.2).

Table 9. Chi-square test observed frequency (and percentage) for settling methods based on parental and research definition of a CSP (Yes/No)

	While feeding	Being rocked	Being held	In bed alone	In bed near parent
Parental perception of CSP					
Yes	45 (56.2)	6 (75.0)	10 (76.9)	45 (34.9)	**17(48.6)**
No	35 (43.8)	2 (25.0)	3 (23.1)	84 (65.1%)	**18 (51.4)**
Research definition of CSP					
Yes	**34 (47.9)**	**5 (71.4)**	4 (40.0)	**11 (10.3)**	5 (17.2)
No	**37 (52.1)**	2 (28.6)	6 (60.0)	96 (89.7)	24 (82.8)

Bold denotes significant standardised residual

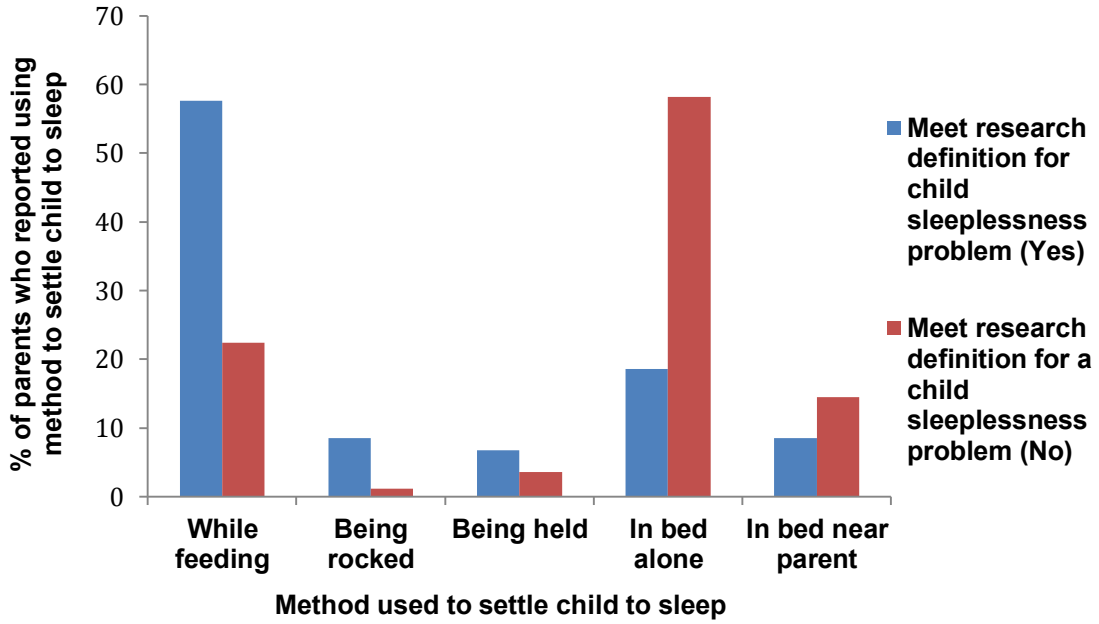

Figure 5. Methods parents used to settle their children to sleep when split by research definition

As seen in Figure 5, children who did not meet research definition for a CSP were most commonly settled to sleep in bed alone. However, children who met the research definition of a CSP were most commonly settled to sleep while feeding.

Chi-square tests indicated there was a significant association between how parents settled their child to sleep and whether the child met the research definition of having a CSP, $X^2(4,N=224)=40.75$, $p < .001$. Table 9 shows the observed frequency and percentage count for each settling method across children who met the research definition for a CSP and those who did not. Examination of standardised residuals suggested that significantly more children who met the research definition were settled through feeding (z=3.5) and being rocked (z=2.3), whereas significantly less were settled in bed alone (z=-3.2). For children who did not meet the research definition of a CSP significantly fewer were settled through feeding (z=-2.1).

4.2. Parental knowledge and understanding about child sleep

To explore parental knowledge and understanding about child sleep, the frequency of parents endorsing responses to SPAQ-C-K items are shown in Table 10.

Table 10. Parental (n=266) responses to the SPAQ-C-K

	Disagree to some extent	Unsure	Agree to some extent
My child's day affects how much they sleep*	58 (21.8)	27 (10.2)	181 (68.0)
Our home/family environment affects how much my child sleeps*	62 (23.7)	42 (16.0)	158 (60.3)
My child's sleep is affected by medical conditions (like heart, breathing, or pain)	149 (56.4)	15 (5.7)	100 (37.9)
Sometimes if my child is feeling upset, it affects their sleep	50 (18.9)	56 (21.2)	158 (59.8)
I care about making sure that my child has enough time to sleep	4 (1.5)	3 (1.1)	259 (97.4)
Getting enough good quality sleep is important for my child to be able to enjoy the day*	6 (2.3)	9 (3.4)	251 (94.4)
Getting my child to sleep at a good time is important to me	25 (9.4)	18 (6.8)	223 (83.8)
Sleep is important to my child's health*	1 (0.4)	3 (1.1)	262 (98.5)
If my child does not get enough sleep this can lead to serious consequences*	39 (14.7)	49 (18.4)	178 (66.9)
Poor sleep affects the quality of my child's life	35 (13.2)	33 (12.4)	198 (74.4)
My child's health professional has discussed the importance of a regular sleep schedule for my child	169 (63.5)	34 (12.8)	63 (23.7)
My child's health professional has discussed the importance of my child getting enough sleep	164 (61.7)	30 (11.3)	72 (27.1)
If my child is really bored, they might fall asleep, even if they slept well the night before^	215 (81.4)	32 (12.1)	17 (6.4)
If my child lies in bed with their eyes shut that is as good as sleeping^	208 (78.2)	39 (14.7)	19 (7.1)
I can tell when my child is sleepy*	8 (3.0)	2 (0.8)	256 (96.2)
Children who fall asleep at nursery or school are lazy or have bad habits^	240 (90.2)	23 (8.6)	3(1.1)
I prioritise the importance of sleep to my child	8 (3.0)	33 (12.5)	224 (84.5)
Getting enough good quality sleep is important for children when they are growing up*	0	1 (0.4)	265 (99.6)
I think my child's sleep is important	0	0	100

Frequency (percentage) reported. Maximum of 4 responses missing for any one variable.
*Denotes positive while ^ denotes poor knowledge or understanding about child sleep.

Upon individually reviewing items that were deemed to represent positive or negative parental knowledge and understanding about sleep, over 60% of parents agreed with positive items and over 78% disagreed with negative items, which suggested that parents appeared overall to have reasonable knowledgeable levels about child sleep. Specifically, there was clear awareness of the potential of sleep to relate to their child's daytime functioning, and parents strongly emphasised the importance of sleep for their children. However, there appeared to be a less consistent understanding about how external factors may play a role in influencing their child's sleep. Over 60% of parents disagreed that they had discussed the importance of a regular sleep schedule or the importance of their child getting enough sleep with a health professional. This suggests that child sleep is not an issue which is routinely being discussed between parents and HCPs; it may be that parents had not attended regular meetings or sought this type of information from their HCPs, or that the topic of sleep is not being raised by HCPs in their contact with parents.

4.2.1. Relationship between parental knowledge and child sleep

Mann-Whitney tests were used to explore associations between parents' knowledge and understanding about child sleep (assessed by SPAQ-C-K total score) and CSPs (parent report and research definitions). There were no significant differences between levels of parental knowledge in the parents of children who did and did not meet the parental definition of a CSP. However, levels of parental knowledge between parents whose children did (*Mdn*=10, *IQR*=4) and did not (*Mdn*=8, *IQR*=4.5) meet BISQ research definition of a CSP differed significantly, U=3531.00, N=224, *p*=.002. This suggests that parents of children who met the research definition for a CSP had poorer knowledge about child sleep than those whose children did not meet the research definition for a CSP.

4.3. Parental help-seeking

4.3.1. Proportion of parents who had sought help and the sources used

A large proportion of parents (n=179, 67.3%) reported having sought advice, information, or help for their child's sleep at some point. The proportion of parents who reported having used individual source types for the sample as a whole, as well as divided according to the child's age groups of 6-12, 13-24, and 25-36 months are displayed in Figure 6. Parents selected as many sources as were relevant to them and so each parent may have selected multiple sources.

Across the whole sample and all age groups, general Internet searches were the most common source of information to parents. Health Visitors (HVs), other parents, books, and trusted parenting or health websites were also other commonly used source

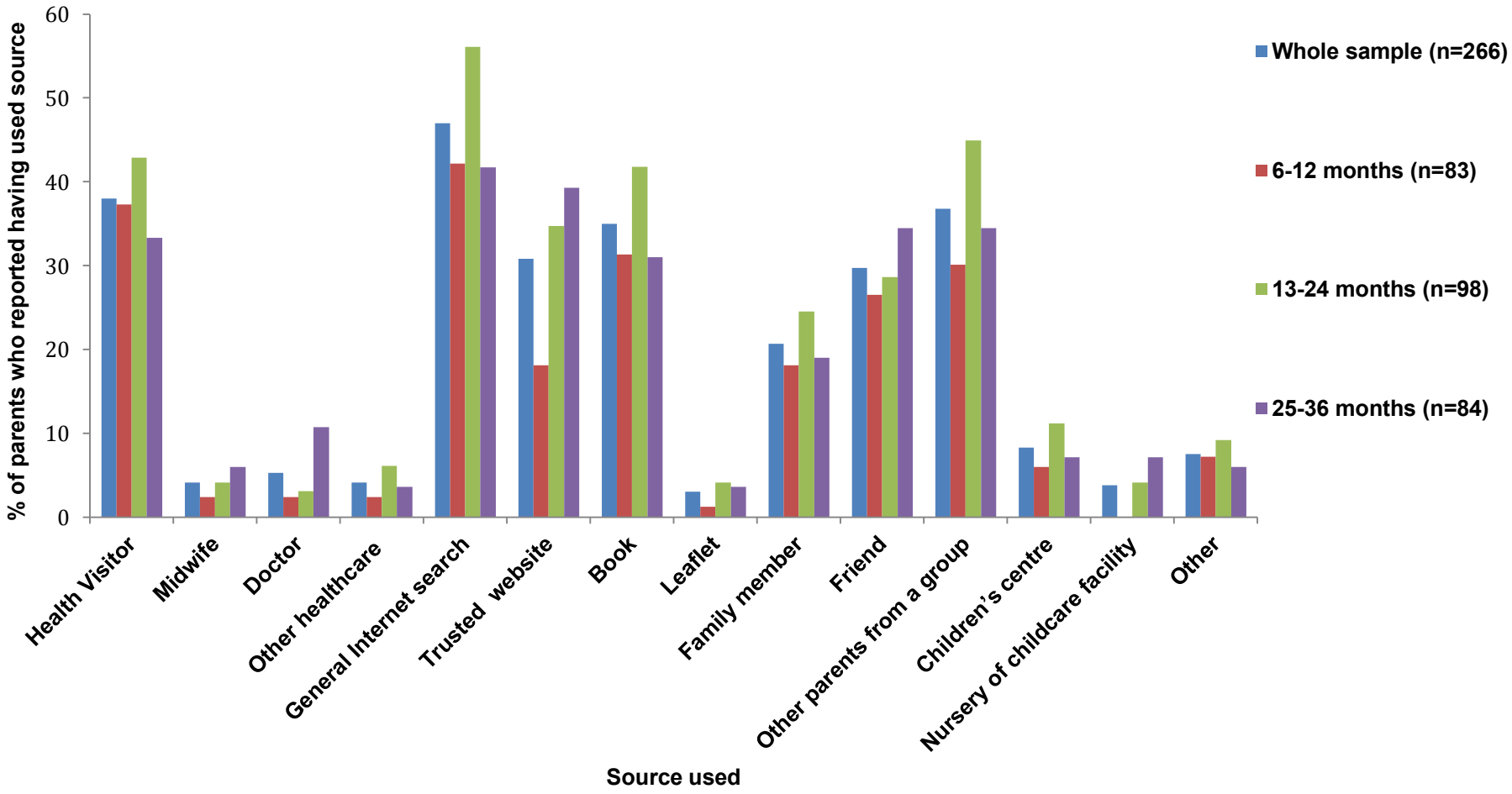

Figure 6. The percentage of parents who reported having utilised different sources to obtain advice, information, or help for their child's sleep across the whole sample, and across age groups 6-12 months, 13-24 months, and 25-36 months

4.3.2. What treatments had been suggested to parents and what methods had parents tried?

Parents who reported that they had previously sought advice, information, or help for their child's sleep were subsequently asked which specific suggestions had been recommended to them to improve child sleep. Parents reported all methods suggested and, for each, whether they had tried the suggestion and if so, whether it was helpful.

Parents' responses to the original list of 27 possible different treatment methods provided in the questionnaire were reduced to seven broad categories. *Behavioural* referred to any method which sought to address and change parental approaches and behaviours towards their child's sleep to eliminate undesirable associations or behaviours, ultimately reinforcing desirable associations and behaviours for the child around sleep. *Co-sleeping* referred to any method whereby parents took the child into the parental bed or slept with the child at any point during the night, ranging from initially settling to waking up the next morning. *Sleep hygiene* referred to routinely recommended practices that are commonly suggested to promote healthy sleep. These included having a bedtime routine, an appropriate sleep environment, and appropriate daytime activities. *Medication* referred to the administering of any over-the-counter or prescribed medications intended to have a sedative or sleep inducing effect on the child. *Dietary change* referred to modifying foodstuffs, mainly focused on reducing reflux or allergies by altering feeding schedules or the use of a dietary supplement. *Treatment of medical condition* referred to treating any other medical condition which had the potential to impact upon the child's sleep. *Other* referred to any other method, which was included in the original list of treatment options or was noted by parents, but did not conceptually fit into any of the above categories. These included methods such as cranial osteopathy, acupuncture, and scheduled awakenings. The number of parents who reported having been advised to try each type of treatment method, the number of parents who had tried each category of method, and the number of parents who had tried each method and perceived it as having been useful are presented in Table 11. See Appendix 6 for details of all 'other' suggestions parents reported had been proposed to them.

Table 11.Treatment methods that had been proposed to parents, whether they had tried the methods, and their perception of its efficacy

Treatment suggestion category	Parents (n=266) who had been advised to try method	Of those who been advised to use method, parents who reported they tried the method	Of those who tried the method, parents who reported the method had been useful
Behavioural	126 (47.4)	87 (69)	66 (75.9)
Co-sleeping or physical contact	78 (29.3)	75 (96.2)	64 (85.3)
Sleep hygiene	131 (49.2)	125 (95.4)	110 (88)
Medication (prescribed and OTC)	9 (3.4)	5 (56)	4 (80)
Dietary change	21 (7.9)	9 (42.9)	9 (100)
Treatment of medical condition	7 (2.6)	7 (100)	7 (100)
Other	51 (19.2)	33 (64.7)	18 (54.5)

Frequency (percentage) reported

Parents who reported they had not tried out the method(s) suggested to them (n=321) were asked why they had not done so. Reasons given by parents are shown in Table 12. See Appendix 6 for breakdown of all 'other' responses.

Table 12. Reasons (n=259) that parents reported for not having tried treatment methods that had been proposed to them

Source	Frequency (%)
I don't agree with the principles of the advice/treatment	82 (31.7)
I don't think it is going to work	33 (12.7)
I don't know anyone else who has done it	3 (1.2)
I do not think the advice/treatment applies to my child	32 (12.3)
It would not be practical for our particular family	46 (17.8)
I have tried previously and it was not helpful	29 (11.2)
I have not been shown scientific evidence that it has been shown to be helpful	25 (9.7)
Other	9 (3.5)

4.3.3. Why did parents not seek advice, information or help for their child's sleep problem?

Of the sample, 87 (32.7%) parents reported never having sought information, advice, or help for their child's sleep. Of these 87 parents, the most commonly reported reason for lack of help-seeking was 'my child's sleep has never been something I have needed advice, help or treatment for' (n=59, 68%), yet some parents felt that 'although my child had a sleep problem I chose not to seek help' (n=26, 30%). Two parents (2%) did not report why they had not sought help.

The parents (n=26) who reported 'although my child has a sleep problem I chose not to seek help' were asked why they had chosen not to seek help. Results are shown in Table 13. See Appendix 6 for breakdown of all 'other' responses.

Table 13. Reasons why parents (n=26) who perceived their child as having a sleep problem chose not to seek help

Reasons why parents who perceived their child as having a sleep problem did not seek help	Frequency (%)
I believe my child will grow out of their sleep problems	25 (96.2)
Other problems in my child are more important	0
Other problems within the family more pressing	1 (3.8)
Have tried interventions with other child and not successful	1 (3.8)
I am not aware of any treatments which I would feel comfortable using	4 (15.4)
There are no appropriate places I can access such help	1 (3.8)
I should know how to help my child without asking for help	3 (11.5)
Other	7 (26.9)

4.3.4. What did parents want or find most useful about sources?

To explore what parents wanted or found most useful about sources, thematic analysis was undertaken on parents' open-text box responses. A number of themes emerged from the data, which cut across individual source types and highlighted overarching reasons, preferences, and motivations for why parents found sources most useful to them. These themes and their sub-themes are presented in Table 14.

Table 14. What parents found most useful about sources for child sleep

Themes and subthemes	Description	Example quotes	Number of parents who reported
A. Experience	Source or information is based on relevant, personal or professional experience	*'The reason the advice here is of such good quality is that they all have relevant recent hands on experience' (Mum, 25 of girl 9 months)* *'Experience is the best knowledge' (Mum, 28, of girl 19 months)*	139
A.1. Understanding of other parents' experience	Source or information is based on actual personal experience(s)	[Friends or other parents] '*…who are going through / have been through a similar thing. Empathy and experience are a great thing!' (Mum, 35, of boy 19 months)* *'Experience and advice from other parents who have endured and relate to what I'm going through and express what has worked for them' (Mum, 28, of boy 29 months)*	98
A.2. Practical use of advice or methods in real-life	Source or the information provided was tangible to real-life practical use	*'It's helpful to speak to other parents who can give a real impression of life with a baby rather than examples in book or online which may not be specific or real' (Mum, 28, of boy 6 months)* *'Having practical advice is invaluable when you're a new parent. I want advice from other parents, who know the struggle, can relate, and can give practical advice' (Mum, 29, of boy 17 months)*	64
B. Sources that were in line with parenting approach	The source or its content was in line with the parent's desired parenting style or approach to parenting	*'…mums in this group have similar approach so helps me to feel our sleep is more normal!' (Mum, 35, of girl 34 months)* *'We felt that a lot of the advice didn't fit with how we wanted to parent' (Mum, 38, of boy 33 months)*	95

Themes and subthemes	Description	Example quotes	Number of parents who reported
B.1. Actively seeking or avoiding certain approaches	The source or its content includes or avoids certain methods or approaches. In the current study there was a desire for gentle or attachment methods and a desire to avoid extinction-based methods	*'I wouldn't even bother going to health professionals as my expectation is they would advise you to leave Baby or Child to cry it out…I don't believe any mainstream resources would support us' (Mum, 34, of girl 26 months)* *'I wanted gentle/attachment parenting advice' (Mum, 31, of boy 15 months)*	98
C. Parental perception of reliability of source	Source, information or individual delivering advice is perceived by parent to be basing advice on reliable evidence or research	*'…scientifically researched information about normal infant sleep…' (Mum, 39, of girl 34 months)* *'I generally prefer to take advice from trusted websites such as the NCT* [National Childbirth Trust] or NHS [National Health Service] *websites as they contain factual information with references etc' (Mum, 29, of girl 16 months)*	68
D. Support and re-assurance	Source provided support and re-assurance, both in relation to child sleep generally, as well as specific sleep issues	*'Talking to other mums reassured me my baby's sleep pattern was common and helped me feel calmer about the way I managed him' (Mum, 28, of boy 6 months)* *'Doesn't always solve issues but helps you realise everyone has them. Knowing others are in the same/similar boat does wonders' (Mum, 37, of girl 14 months)*	66
D.1 Trust	Parents perceived that the source, individual or information could be trusted	*'[I]…prefer to read what people suggest / experiences online and speak to people who I know well and trust' (Mum, 35, of girl 35 months)* *'The crucial thing here is that I trust these people' (Mum, 25, of girl 9 months)*	31
Themes and subthemes	**Description**	**Example quotes**	**Number of**

			parents who reported
E. Having access to a broad range of information and the ability to select what is relevant	Parents desired having access to a broad range of information (which may come from various sources) and included a range of diverse options and ideas, from which they were able to select only aspects that they agreed with, or felt would be useful in their individual circumstances	*'Personally I like to consider different options and then weigh them up, what is best for me, my baby, our family- how will it impact our routines, our work/life balance' (Mum, 40, of boy 24 months)* *'We are looking for a balanced opinion on what to try....we've found it most useful to get a variety of ideas before deciding what to try' (Mum, 35, of boy 6 months)*	61
F. Normal child sleep information or normalised child sleep behaviour	Source informed parents about normal child sleep or normalised child sleep behaviour. Many parents sought to obtain information which allowed them to make a comparison between their own child with children of a similar age	*'All the resources above have been helpful as they have normalised my baby's sleep pattern which has prevented me from problematising him…' (Mum, 37, of boy 8 months)* *'…helping me to understand sleep and reasons why baby isn't sleeping' (Mum, 29, of girl 10 months)* *'It's more being able to compare with other babies the same age, rather than the actual advice itself' (Mum, 30, of boy 11 months)*	58
G. Individually focused and non-generic	Information or advice from sources or individual(s) which was specific to the child, family or individual circumstances and not just general information	*'All babies have their own personality traits and don't necessarily fit the books image of a typical baby' (Mum, 29, of girl 10 months)* *'They actually know my son and don't provide generic advice' (Mum, 27, of boy 16 months)*	50
H. Easily and quickly accessible	Sources which were easily and quickly accessible as and when required	*'…given time constraints they are the most practical also' (Mum, 32, of boy 10 months)* *'…it's available 24/7. I don't need to make an appointment' (Mum, 30, of boy 25 months)*	45

Themes (grey), subthemes (white), description, and supporting quotes reported

The overarching themes and subthemes of what parents wanted and found most useful about sources for child sleep were broad and diverse in nature. Therefore, a more detailed explanation of the nature of each theme and sub-theme is provided below to offer additional context.

Theme A. Experience

For some parents, importance was placed on information being provided by someone whom they perceived as having relevant experience to their specific circumstances or problem. Parents used a range of sources to access experience-based information. What constituted experience appeared to be described, by parents, in broad terms; some parents showed a distinct preference for personal experience, whereas others preferred professional experience, frequently acknowledging the potentially broader experience of the professionals and also their familiarity with research evidence.

A.1. Understanding of other parents' experience

Many parents showed a preference for information or advice that was based on other parents' experiences. This preference stemmed from a desire to obtain information about parents' personal experiences of managing child sleep and the range of methods that could be used, including which methods had or hadn't worked for them. This was considered useful to parents, as it went beyond the perceived limited scope of other sources such as books or HCPs. For many parents, 'personal experience' was also valued as those supplying the information were seen as having greater empathy and understanding of the wider context of the problems, such as the circumstances parents may be experiencing or the struggles they may be facing.

A.2. Practical use of advice or methods in real life

Parents valued others' personal experience because such information or advice was deemed by many parents to be more credible, realistic, and tangible to them than information which came from predominantly HCPs. Parents did not want to base their decisions solely on the results of research trials but also valued understanding how strategies could be applied in 'real-life' settings. Because of this, many parents stated that HCPs did not necessarily provide them with realistic or implementable ideas. While many parents acknowledged

that sources based on personal experience were limited to anecdotal or subjective opinions or experiences, for others it was precisely for this reason that they perceived these sources as most relevant and useful.

Theme B. Sources that were in line with parenting approach

Parents most commonly, if not exclusively, selected or most respected information from sources which were in line with their parenting style or approach. Some parents reported that the majority of sources available to them did not meet their personal needs because they did not reflect their fundamental parenting beliefs. Many parents highlighted that the information or advice available to them from HCPs and some written materials were not useful to them because they were not in line with their parenting approach.

B.1. Actively seeking or avoiding certain approaches

It was essential to some parents that sources used reflected their desired parenting approach. Many parents reported preferring gentle and/or attachment parenting approaches and managing their child's sleep. Some parents did not necessarily seek information in line with a particular approach, but knew the type of approach to managing their child's sleep that they did not want. Identifying the type of information desired before seeking it may be specific to parents who adopt gentle or attachment style parenting approaches, as conversely, parents did not commonly report that they actively sought behaviourally based methods.

Theme C. Parental perception of reliability of source

The evidence base underlying the information or advice offered by sources was a key concern. For some parents there was a clear desire to use sources which they perceived to be supported by reliable evidence or research, and often this encouraged them to use resources such as HCPs and related resources. Other parents were open to using any source type but had a clear awareness of the questionable evidence base of some information obtained from more informal types of sources, and considered this in their decision-making process.

Theme D. Support and re-assurance

In many cases it was not just the content of the information received that was key, but also, and perhaps most importantly, the broader support, reassurance, and 'human element' offered by sources. For many parents this type of support came from sources based on 'personal experience', as has been highlighted under Theme A above. These sources were valued because those supplying the information were seen as having greater empathy and more understanding of the wider context parents may have to deal with. For example, other parents were perceived to have the best understanding about the realistic challenges and issues associated with child sleep, and so could effectively offer to support to those going through something similar. For many parents, receiving support and reassurance from those who they perceived to understand their situation allowed them to feel more confident in their parenting, in handling their child's sleep, and staying calm when dealing with their child. For many, receiving reassurance was as beneficial as any actual advice.

D.1. Trust

Perhaps unsurprisingly, another aspect valued by parents was feeling they could trust the individual(s) delivering the information offered. In many cases, parents wanted to feel confident that the person delivering the information had the parent, child, or families' best interests at heart and that they would be offering unbiased but reliable information. Some parents were concerned that individual(s) or institution(s) may have an agenda, which resulted in their trustworthiness being questioned by parents.

Theme E. Having access to a broad range of information and the ability to select what is relevant

While some parents showed a preference for using only a few specific sources, many indicated that having the ability to access a wide range of sources was preferable as it allowed them to explore a range of options and ideas. Many parents actively sought information or advice from different perspectives, so that they could review a range of options before making an informed decision about what best suited them, their child, and their individual circumstances. Many parents also emphasised using a range of sources, which allowed them to select only the aspects of information or advice that they liked, agreed with, or

felt would be useful to their issue. This approach enabled parents to acknowledge the individuality of their child, their parenting style, and their circumstances.

Theme F. Normal child sleep information or normalised child sleep behaviour

There was a desire for sources which informed parents about normal child sleep or that normalised child sleep behaviour. Some parents were keen to understand biological and developmental aspects of child sleep. However, what was key to other parents was obtaining information that helped them to understand or develop expectations about their child's sleep in a real-life situation, and not just theoretical or scientific information. Some parents reported that they lacked knowledge or understanding of what should constitute normal child sleep, and so sought out resources which could fill the gaps in their knowledge. Many parents sought age specific information in order to compare their own child's sleep and seek assurance that it was 'normal' or similar to other children of the same age or stage of development.

Theme G. Individually focused and non-generic

Another reason parents found certain sources most useful was that the information or advice was personalised and not just general or generic. Some parents distinctly preferred using sources that were familiar to them and where there was some form of existing relationship, as they perceived the information was likely to be individually tailored and based upon their individual child, familial circumstances, and parenting approach.

Theme H. Easily and quickly accessible

Practical issues or concerns were also important to parental use of sources. Specifically, this included the availability and accessibility of the sources, so readily accessible sources such as online information, family members or other parents were particularly useful.

4.3.5. General parentally reported concerns, reservations or barriers to using sources

In addition to the aforementioned themes, which detailed what parents found most useful about sources in general, there were also themes that revealed the reservations and barriers that parents experienced in using sources for child sleep. These cut across specific types of source, and are reported in Table 15.

Table 15. Parental barriers to using sources for child sleep

Themes and subthemes	Description	Example quotes	Number of parents who reported
A. Parental concerns of reliability	Parental concerns about the reliability, evidence base or potential bias of the sources or individuals delivering information or advice	*'Impossible to know how reliable a source is or whether it is truly evidence based' (Mum, 27, of girl 19 months)* *'Interpretation. Relevance. Fact versus fiction. Old wives tales' (Mum, 40, of boy 24 months)*	125
B. Judgemental	Parental concerns about being generally judged due to their child's sleep issues. There were also concerns that certain sources may be judgemental or critical about their handling of the issues	***'…****results in a lot of parents lying to health professionals because they feel like they are being judged' (Mum, 29, of boy 25 months)* ***'****I do not wish to be judged by friends and family on the fact my little one does not sleep through whereas their children might do' (Mum, 23, of boy 7 months)* *'Don't listen to friends with similar aged children as it's a lot of competition about who's baby sleeps better' (Mum, 26, of boy 12 months)*	53
B. 1. Negative emotional or relationship consequences	Potential negative emotional or relationship consequences to using certain sources for information or advice. This was particularly relevant to concerns about affecting relationships with those close to them	*'Advice is too emotionally pressured especially for a new/ first time mother' (Mum, 45, of girl 24 months)* *'Full of well meaning advice but can sometimes imply you are doing everything wrong. Affects your relationship with them if they make you feel that way' (Mum, 36, of boy 20 months)*	19
C. Previous negative experience of source	Previous negative experience of a particular source or source type	*'Didn't receive very helpful support in the past' (Mum, 36, of girl 17 months)* *'Never again - I have received nothing but outdated and conflicting advice, given without me asking and with plenty of snap judgements' (Mum, 34, of boy 22 months)*	46
Themes and subthemes	**Description**	**Example quotes**	**Number of parents**

			who reported
D. Hard to filter information	Parents found it challenging to identify, obtain or filter information from a specific or from multiple sources	*'The internet gives u [you] a lot of results and sifting through them to find things that are relevant is so difficult' (Mum, 31, of girl 18 months)* *'So many conflicting views it is sometimes difficult to know what to pay attention to' (Mum, 34, of boy 12 months)*	29
E. Information too general	Parental concerns about the relevance of the information. In many cases information obtained was perceived to be too generic to be useful	*'Lack of time to really understand issue and therefore giving of generic advice' (Mum, 33, of girl 9 months)* *'All babies are different so these sites may offer good general advice but it may not work' (Mum, 32, of girl 11 months)*	25
F. Conflicting information or advice received	Parental concerns or confusion due to receiving conflicting or opposing information or advice from sources	*'…it's insane how many are handing out such conflicting and awful advice' (Mum, 34, of boy 22 months)* *'There's a lot of conflicting advice, which can be confusing' (Mum, 27, of boy 11 months)*	24
G. Limited accessibility	Issues around lack of accessibility, particularly in relation to sources that required parents to attend in person or make appointments	*'It's very difficult to get appointment with gp or midwives and baby clinics may be at an inconvenient time' (Mum, 34, of boy 23 months)* *'One of the barriers to seeking advice from professionals is the difficulty (time and access) in getting to see them' (Dad, 34, of girl 31 months)*	20

Themes (grey), subthemes (white), description, and supporting quotes reported

Theme A. Parental concerns of reliability

Parents held concerns about using resources where the reliability of information was perceived to be questionable. These included worries about the evidence base of the information and being able to recognise the potential bias of sources. While this concern was highlighted for many source types, it was seen as particularly pertinent in relation to online sources as many parents reported that it was challenging to determine if information was reliable, who had authored it, and if it was genuinely evidence-based information. Further concerns were raised about whether some, again particularly online, resources may have an associated ulterior motive (e.g., to promote or sell a product or service). However, not all concerns about reliability related to online sources; there were also uncertainties about the evidence base of information obtained from written information. Notably, some parents were concerned about the reliability of information from HCPs. Many parents did not believe that their HCPs possessed up-to-date, evidence-based knowledge, or that they would deliver reliable advice.

Theme B. Judgemental

There was an overarching fear of being judged by people who were involved in delivering advice, guidance, help, or support across the full range of sources. Parents were most commonly concerned about being judged by HCPs, other parents or family members. On occasion, fear of judgement resulted in parents not being honest about their problems, which clearly may have had implications for the usefulness of any advice given. Parents frequently felt that child sleep was a controversial topic about which many people held strong views. In addition, due to societal expectations and social pressures, child sleep was reported as a topic which could generate rivalry or competition between parents. This was most strongly reported as a reservation for using family and friends, but was also mentioned in relation to use of online sources. Interestingly, some parents with ‘good’ sleepers highlighted that because of concerns about the competition element of child sleep and the possibility of causing offense, they did not raise or discuss the topic with other parents.

B.1. Negative emotional or relationship consequences

A reservation which emerged predominantly, although not exclusively, in relation to using family or friends as sources of information, was concerns about the potential for negative emotional or relationship consequences. In many cases, parents were cautious or even avoided using these types of sources for information, advice, or help for child sleep due to fears of causing negative emotional consequences or disrupting relationships with those they would be required to interact with in the future. In some cases, parents were concerned about being made to feel guilty, or criticised by those close to them. Avoiding these types of source was seen as a way to avoid potential negative emotions, opposing views or future awkwardness. In addition, in many cases there were concerns that if parents approached those close to them they would be pressured to put into practice the advice provided. This appeared to be a primary concern in cases where differences in inter-generational or parenting approach were apparent.

Theme C. Previous negative experience of source

Previous experiences of sources strongly influenced their future use. Previous personal negative experiences or hearsay of others' negative experience of a source negatively influenced parents' own perception and use of that source. Interactive online sources, such as parenting groups and chat rooms, were a source type where the contentious nature of child sleep could be problematic and result in negative experiences. Forceful and aggressive exchanges about approaches or methods to managing child sleep had been experienced by some parents, and were upsetting, and in some cases distressing, to parents. Previous negative experiences with HCPs were also prominent. Many parents felt HCPs either did not want, or did not have the time, to listen to what parents wanted. Additionally, some parents felt HCPs were not knowledgeable or experienced enough to adequately advise them, resulting in exchanges being viewed as negative by the parent and reducing the likelihood of future use.

Theme D. Hard to filter information

This theme, predominantly but not exclusively highlighted in relation to online sources, was the challenge of finding, obtaining or filtering information. The volume of information available or number of 'hits' resulting from a general

Internet search was, as previously discussed, viewed as beneficial by some parents. For others however, the sheer volume of information and array of different approaches was overwhelming and challenging for parents to understand and synthesise. Many parents struggled to determine which approach or method would be most suitable for them.

Theme E. Information too general

Many parents raised concerns about the relevance of the information they could derive, predominantly online or via books. In many cases, parents felt that the information was either too generic or general and so could not help them in their individual circumstances.

Theme F. Conflicting information or advice received

One of the main reservations and challenges parents experienced when seeking information, advice or support for child sleep was the confusing nature of conflicting or opposing information. Many parents found it impossible to integrate such information. If parents were already struggling to cope with their child's sleep and were sleep deprived themselves, obtaining contradictory information compounded their feelings of confusion and frustration with the situation. As many parents felt they did not have the practical or emotional resources to adequately evaluate the information offered, this resulted in them feeling worried and concerned that their decisions were flawed.

Theme G. Limited accessibility

The lack of availability or accessibility acted as a barrier to parental use of some sources. This was predominantly, but not exclusively, highlighted in relation to parents' use of HCPs or sources that required parents to attend in person or make appointments. Working parents commonly reported accessibility and availability issues as a barrier to them using HCPs.

4.3.6. Other parentally reported barrier to using sources

In addition to reservations and barriers relating to parents' use of sources, one additional factor emerged which also influenced parents' use of sources for their child's sleep. This is reported in Table 16.

Table 16. ‘Other’ parental barrier to using sources for child sleep

Theme	Description	Example quotes	Number of parents who reported
A. Child sleeplessness viewed as normal	While not perceived as a barrier to the parents themselves, perception of child sleeplessness as normal or ‘to be expected’ is a barrier to use of sources	*‘Children either sleep or don't sleep. My daughter doesn't have medical issues preventing her from sleeping, she's just a light sleeper who wakes often and wants comfort’ (Mum, 36, of girl 26 months)* *‘Sleep problems are considered pretty normal so I'd be unlikely to mention this anyway…’* (Mum, 32, of girl 6 months)	12

Theme (grey), description, and supporting quotes reported

Theme A. Child sleeplessness viewed as normal

Some parents considered CSPs as synonymous with childhood and expected some level to occur. In such cases, many parents reported that even if they viewed their child’s sleep as problematic they had not or would not seek additional information, help, or support. Many parents appeared to believe CSPs would improve or cease naturally in time.

4.3.7. Parentally reported barriers to using specific types of sources

Several barriers or reservations which were specific to a particular source type and impacted parents’ use of the source were apparent. Parentally reported

barriers or reservations that were specific to HCPs, online resources, family or friends (which included other parents), and written information are presented below.

Parentally reported barriers to their use of HCPs

Six themes and two sub-themes emerged from the data as to why parents had reservations or perceived barriers to using HCP sources in relation to their child's sleep. These are displayed in Table 17.

Table 17. Parental barriers to using HCP sources for child sleep

Themes and subthemes	Description	Example quotes	Number of parents who reported
A. Lack of knowledge or training	Parental concerns about HCPs level of knowledge or training in relation to child sleep. This ranged from knowledge about normal child sleep to how to help with CSPs	*'My previous health visitor was not someone I respected as she appeared uneducated and inexperienced' (Mum, 31, of girl 28 months)* *'They are not kept up to date on research, they want "quick fixes" and make parents feel that they are wrong when they follow their instincts causing them to lose faith' (Mum, 29, of boy 35 months)*	62
B. Professionals lack of flexibility	Many parents perceived HCPs, particularly HVs, lacked flexibility in the advice, options or treatments that they would offer to parents	*'Health care professionals (midwives, health visitors, etc.) whilst having a wealth of knowledge, can only advise the recommended guidelines' (Mum, 29, of boy 17 months)* *'Information from health professionals is often more specific as I feel it's more what they are told to say and might not necessarily be useful' (Mum, 31, of girl 35 months)*	54
C. Concerns about wasting time	Parents held concerns that their use of HCPs would be viewed as time-wasting	*'I wouldn't want to feel like I was wasting the time of a health professional, especially the doctor' (Mum, 37, of girl 16 months)* *'Sleep doesn't seem like an issue I need to bother a HCP with' (Mum, 36, of girl 30 months)*	34

Themes and subthemes	Description	Example quotes	Number of parents who reported
C.1. Sleep not seen as an important issue to HCP	Parental beliefs that HCPs did not perceive child sleep as an important or relevant issue	*'Don't really seem to care. Maybe lack of time/resources but feel like I'm just being a pain [if] I go about this issue' (Mum, 28, of girl 36 months)* *'Have never found medical professionals helpful for sleep - they don't seem to consider it an issue or haven't been very supportive/given very clear/helpful advice' (Mum, 34, of boy 12 months)*	19
C.2. Dismissive or patronising attitude towards parents	Parental beliefs that HCPs had a patronising or dismissive nature and were not approachable and supportive	*'[They are]…sometimes being dismissive of a new parent's concerns' (Mum, 33, of girl 16 months)* *'Health professionals tend to speak down to me as a mother and brush off my concerns, making me feel bad and stupid' (Mum, 33, of girl 26 months)*	38
D. Parental concerns about negative consequences for family	Parents held concerns that they would be judged and potentially viewed negatively by HCPs for struggling with their child's sleep	*'Feel that you are being judge & labelled as a "bad parent" and "struggling to cope", & may go on a list as a concern' (Mum, 28, of boy 29 months)* *'Sometimes I feel like I have to show my hv that I'm coping and as a result I don't feel I can be honest about what's happening' (Mum, 34, of girl 10 months)*	24
E. Lack of continuity or conflicting information from HCPs	Parents perceived that there would be a lack of continuity and that inconsistent information would be obtained both from different HCP professions as well as across specific HCP professions	*'I feel like there is inconsistency between healthcare professionals, I've been given differing advice on the same issue by different HVs and GPs' (Mum, 38, of boy 22 months)* *'Variable information, often based on opinion or personal experience rather than current research' (Mum, 32, of boy 24 months)*	22

Themes (grey), subthemes (white), description, and supporting quotes reported

Theme A. Lack of knowledge or training

A number of parents had made use of HCPs for information, help or guidance about child sleep. However, there was a strong belief that HCPs lacked knowledge about child sleep. For some parents, this was based on their own personal experiences of HCPs delivering what was perceived to be poor or incorrect information or advice. For other parents, the reasons for this view were less clear but there was evidence of a prevailing belief that HCPs had limited training on the topic of child sleep, as well as an insufficient breadth in their knowledge to be able to successfully help and support parents. Some parents specifically highlighted that they perceived a lack of HCP knowledge and skills about child sleep to be the result of poor training.

Theme B. Professionals lack of flexibility

While many parents felt HCPs had a range of information and advice to offer, many others perceived the information, advice, or guidance offered would lack flexibility because HCPs were only able to offer officially sanctioned guidelines. This meant professional sources were not the most valued or were used sparingly. Whilst, as noted, it was perceived that professional advice was most likely to be based on research evidence, not all parents held such a view. Some parents, who disagreed with the advice typically offered by HCPs, considered that professional sources were explicitly not delivering information based on current research or evidence. Where a parenting approach to child sleep was not in line with the ideology underlying any official guidelines about intervention, it was valuable and beneficial when professionals recognised the parents' desires and adapted their advice accordingly.

Theme C. Concerns about wasting time

It appeared that many parents had reservations about using HCPs due to worries that HCPs would view their visits as a waste of their time. While this was most commonly highlighted to be in relation to the use of a doctor, for some parents this was deemed an issue across different groups of HCPs including HVs. However, there were also parents who made the potentially erroneous assumption that any visit to a HCP for advice or help in relation to child sleep would be a waste of time for them. These parents thought a visit to a HCP

would be a waste of time as did not believe that any HCP would offer anything beneficial to them.

C.1. Sleep not seen as an important issue to HCP

Parents held concerns, and others reported having previously experienced, that HCPs do not regard sleep as an important issue. For parents of children with CSPs their child's sleep was clearly a key issue for the family. The belief that HCPs would not view the matter in the same manner resulted in feelings of frustration and disenchantment with HCPs sources and the system more generally and this deterred some from using these sources in the future.

C.2. Dismissive or patronising attitude towards parents

Many parents were put off using HCPs because of the perception that HCPs would employ a dismissive or patronising attitude towards parental worries or concerns about child sleep. This perception was often based on personal experience of having sought advice or help from HCPs for CSPs in the past. In other cases, parents had made use of HCPs for other issues relating to their child and had unfavourable experiences. They believed the HCPs' attitude would be the same regardless of the issue, so avoided using them in relation to child sleep. Parents' perceptions of HCPs attitude and approaches to CSPs were not just based on parents' own experiences, but also on hearsay regarding what other parents reported about their own experiences with HCPs.

Theme D. Parental concerns about negative consequences for family

Another barrier to parents using HCPs was concern about how they would be viewed by HCPs if they admitted that they were struggling or needed help in relation to child sleep. In many cases, parents felt that they could discard information they didn't agree with if it was obtained via most types of sources, as highlighted above in section 4.3.4 Theme E. However, as HCPs dealt directly with the family (be it face-to-face, phone, or email contact) and were seen by parents to be in a position of power, there were concerns about possible negative outcomes if parents did not implement what was recommended by the HCP.

Theme E. Lack of continuity or conflicting information among HCPs

An additional reason why parents had concerns about utilising HCPs was the lack of continuity of the information they received, which was confusing and unsettling. In many cases, it was reported that they received different information from different types of HCPs, for example being told one thing by a doctor and another by a HV or even a lack of continuity within professional specialities; for example, one HV giving different or conflicting information to another HV. It appeared that many parents were accepting of variations in advice between HCPs and other sources. However, there appeared to be an unmet expectation that information and advice obtained from HCPs should be consistent and not contradictory. In addition, many parents felt there was a lack of continuity between the HCPs they saw, and this negatively impacted upon the continuity between the information received. Some parents felt it would be beneficial, where possible, to see one dedicated individual across medical or developmental checks. Obtaining different advice across sources was frustrating, confusing, and resulted in parents losing confidence in the quality of HCPs' advice.

Parentally reported barriers to their use of online resources

One main theme, reported by parents as a specific barrier to using online resources in relation to their child's sleep, is displayed in Table 18.

Table 18. Parental barriers to using online sources for child sleep

Theme	Descriptions	Example quotes	Number of parents who reported
A. May cause unnecessary worry	Parental concern that using sources may result in receiving unnecessarily worrying or concerning information	*'I would never Google anything because you have too many opinions to read and I feel you end up more paranoid than when you began!' (Mum, 30, of boy)* *'Always gives you the worse answer and worry more over what could be nothing' (Mum, 32, of girl 25 months)*	15

Theme (grey), description, and supporting quotes reported

Theme A. May cause unnecessary worry

There was a feeling among some parents that general Internet searches would return worrying or concerning information, which was not necessarily appropriate or relevant. It was felt that this commonly resulted in unnecessarily increasing parental worries or concerns in already challenging situations.

Parentally reported barriers to their use of families, other parents or friends

There was also one main reservation parents reported specifically in relation to making use of friends, other parents or family members for information or advice with their child's sleep. This is displayed in Table 19.

Table 19. Parental barriers to using other parents, friends or family members as sources for child sleep

Theme	Descriptions	Example quotes	Number of parents who reported
A. Subjective or anecdotal experience seen as negative	Parents desired sources or those delivering information or advice to possess current or recent experience. This was predominantly to avoid what was perceived as biased or out-dated information.	*'…have their own specific experiences based on their own children's nature, their feeding choices, societal expectations at the time they had children' (Mum, 33, of girl 16 months)* *'Friends & family always think they're right based on their own experiences so I learned quickly to avoid their opinions' (Mum, 28, of boy 19 months)*	49

Theme, description, and supporting quotes reported

Theme A. Subjective or anecdotal experience seen as negative

As has previously been mentioned (in section 4.3.4. Theme *A. Experience* and associated subthemes) many parents showed a strong preference for personal over professional experience. However, when it came to using informal types of sources, parents had concerns about how subjective experience could negatively influence information, advice, or guidance provided. For example, some parents felt that information provided by family, friends or other parents would be limited to their own experiences and therefore may not then be relevant for themselves. This was perceived as problematic as it could result in biased, out-dated information, which was not appropriate for the family's specific circumstances. Parents who reported this barrier primarily had

reservations about using older family members or relatives whose experiences might be particularly far removed from their own.

Parentally reported barriers to their use of written information

Parents reported two reservations to making use of written information. These are displayed in Table 20.

Table 20. Parental barriers to using written information sources for child sleep

Themes	Descriptions	Example quotes	Number of parents who reported
A. Time consuming	Parental concerns that these types of sources would be time consuming and parents commonly reported that they did not have enough time to use these sources effectively	*'As a new parent who has time to read?' (Mum, 34, of boy 8 months)* *'Having time to read a book with a baby when you're tired' (Mum, 35, of boy 11 months)*	10
B. Can't ask questions	Parental concerns about not being able to ask questions of these particular types of sources. In many cases parents wanted to be able to obtain information specific to them and ask questions to troubleshoot their individual issues	*'…can't ask a book questions' (Mum, 37, of girl 14 months)* *'I find many books do not offer advice for troubleshooting their methods' (Mum, 31, of girl 28 months)*	5

Themes, description, and supporting quotes reported

Theme A. Time consuming

Parents felt that a barrier to using written resources was the fact that the time required to engage with the material exceeded their available time. Many parents particularly felt that reading entire books was not an easily achievable task.

Theme B. Can't ask questions

Reservations were also evident about using written information because such sources did not provide the opportunity for parents to ask questions or seek clarification about specific methods, ideas or circumstances.

4.3.8. What sources do parents currently use in comparison with what they would like to be able to use in an ideal world?

Parents reported where they would currently seek information or help, given what is currently and realistically available to them, and what they would like to be available to them in an ideal world. This allowed an exploration of any differences between parents' current and ideal source use. Of course, parents' preferences for different sources may differ depending on the type of information they were seeking. For example, the sources they prefer to use for general information about child sleep may differ from those that they would prefer to use when seeking treatment for CSPs. Therefore, the sources parents reported using to obtain general information and specific advice or help between what is currently available and what they would like to use in an ideal world were explored. Results are shown in Figure 7.

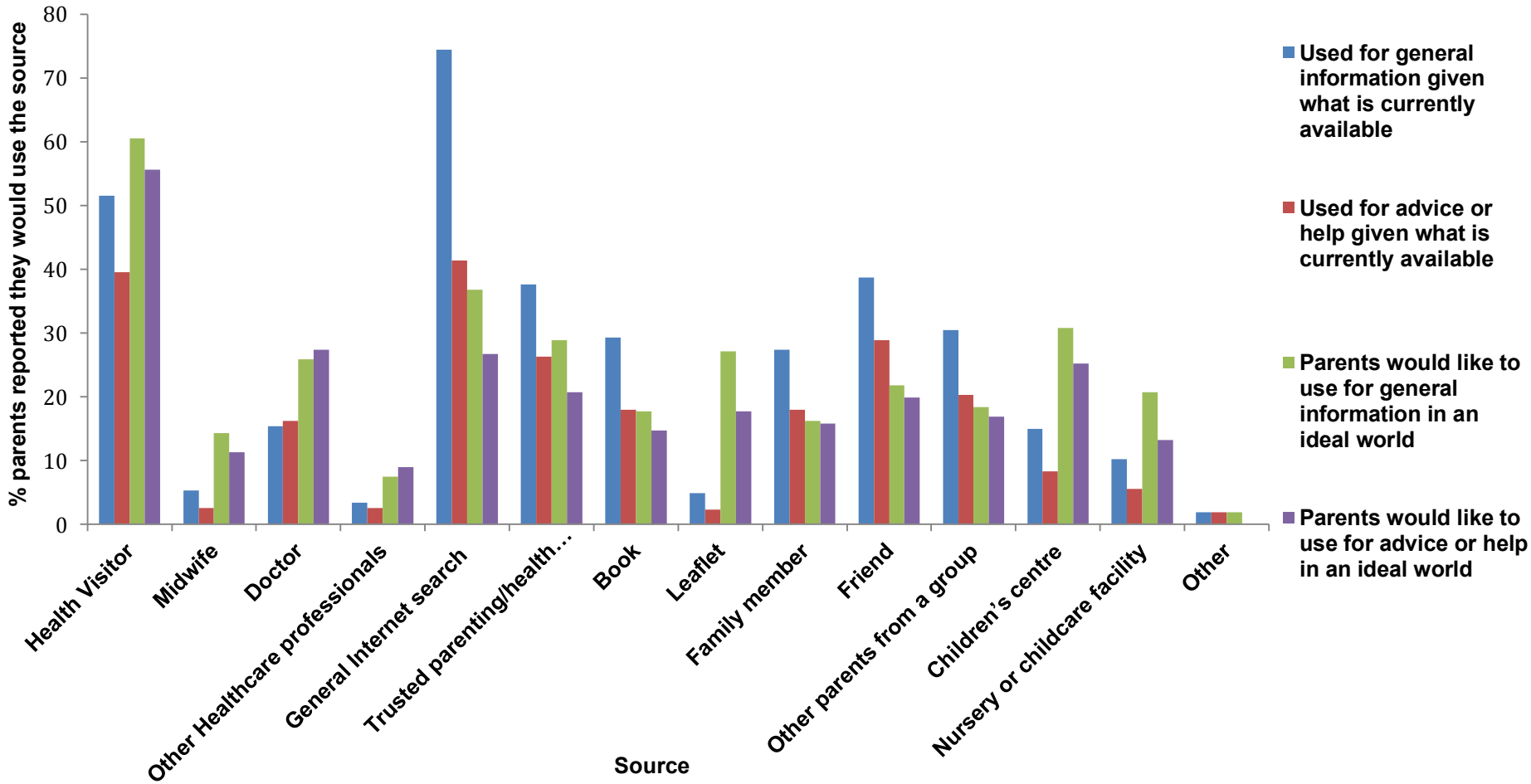

Figure 7. The sources parents reported using given what is currently available to them and what they would like to use in an ideal world, for both general information and advice or help for child sleep

What was clear was that although parents reported they would currently utilise more informal or personal source types, in fact more parents in an ideal world would prefer to make more use of more formal types of sources. This was particularly notable in relation to parents wanting to increase their use of HCPs (HVs, doctors, midwives), as well as children's centres and nursery or childcare facilities. Many parents also reported that in an ideal world, they would like to make more use of leaflets produced by HCPs which included evidence-based information, as a reliable, digestible and helpful resource. In an ideal world, parents reported that they would like to make less use of general Internet searches, trusted websites, family, friends, or other parents, all of which were currently widely used.

4.3.9. What improvements could be made to existing sources to better meet parents' needs?

Given the range of options currently available, some parents (n=15, 5.6%) felt existing resources for child sleep were sufficient. However, these parents acknowledged that a broad range of relevant information was not always easy to obtain. Further, it was noted that parents were required to be actively committed to 'searching' or finding answers to address their specific circumstance or a specific question. However, a similar number of parents (n=14, 5.2%) felt that the existing sources they had used did not currently meet their needs or that nothing previously suggested to them had been useful or worked.

Many parents reported a different pattern of source use in an ideal world compared to what was currently available to them (section 4.3.8). Parents were asked to provide additional information about how or why they felt some sources may be more useful to them in an ideal world in comparison to their current format. By examining parents responses and integrating this with the features of sources which parents valued (section 4.3.4) and what were perceived to be barriers to source use (section 4.3.5 and 4.3.7), it was possible to identify specifically how parents felt that current resources could be altered or adapted to better meet their needs, in an ideal world, in comparison to what was currently available to them. Results are presented in Table 21.

Table 21. Parental desired improvements or changes to what is currently available to them and what they would like to be available to them for child sleep

Theme	Description	Example quotes	Number of parents who reported
A. Increased use of HCPs	While many parents felt there was scope to improve HCP services in relation to child sleep, there was a parental desire to increase their use of HCPs	*'They are people you come into contact regular bit should be better informed' (Mum, 35, of boy 6 months)* *'…having a trusted healthcare worker or mainstream parenting website to have that information would be better for all' (Mum, 29, of boy 35 months)*	62
B. Improved knowledge and approachability of people with whom parents come into contact	Improving the knowledge (about normal child sleep and sleeplessness issues), as well as the interpersonal skills of those who come into contact with parents and young children, primarily HCPs	*'Health Visitors would become more approachable and trusted rather than someone to avoid or lie to about making educated parenting choices. It would be nice to not have to search through websites and forums to find suggestions, information and advice that are backed up with science' (Mum, 29, of boy 35 months)* *'It would be so helpful if all those involved in childcare were appropriately trained in evidence based sleep support. At the moment it feels a total gamble as to what advice you get - it even varies between health visitors quite considerably' (Mum, 27, of girl 19 months)*	56
C. Sources should offer a more balanced view of options or approaches	Sources should provide a more balanced view of a range of the options, approaches and treatments available to parents and should not be limited to only one approach or method	*'Health professionals ought to be better informed and more open minded than a bottle-of-formula-and-cry-it-out approach, which seems to be as far as their knowledge or interest extends in my experience' (Mum, 41, of boy 14 months)* *'It would be good if health professionals offered gentle parenting advice but locally mine do not' (Mum, 34, of boy 25 months)*	41

Theme	Description	Example quotes	Number of parents who reported
D. Access to a sleep specialist	Improving or providing, where necessary, free access to a sleep specialist	*'Seeing a specialist for free who knows about baby sleep would be brilliant' (Mum, 35, of girl 14 months)* *'There are sleep experts but they are expensive so they should provide this service on the NHS in the same way they do lactation experts' (Mum, 32, of boy 10 months)*	18
E. Increase parental knowledge, training, and access to training	Increasing or improving parental knowledge, understanding and awareness of child sleep and how to identify and manage CSPs. It was suggested this could be achieved through increasing the availability and access of education and training opportunities for parents	*'…having a course or group on sleep problems in children to help and support me and others like me' (Mum, 29, of boy 12 months)* *'I think more information could be given to parents (especially new parents) from the HV or baby clinics. So many parents have sleep issues with their children, it would make sense to me to educate more people on the issues and methods for tackling them' (Mum, 32, of boy 10 months)*	16

Themes, description, and supporting quotes reported

Theme A. Increased use of HCPs

In an ideal world, parents clearly desired to make more use than they currently do of HCPs and associated resources (e.g., a webpage or leaflet produced by an HCP organisation). However, many did not feel these resources currently met their needs, and that the information and support offered would need to be improved to encourage them to make use of these sources. For example, many parents reported that they would not feel comfortable using HCPs unless these sources provided a gentler approach to managing child sleep or treating CSPs.

Theme B. Improved knowledge and approachability of people with whom parents come into contact

A key concern to parents was that those who dealt with CSPs, such as HCPs, needed to be well trained and knowledgeable about child sleep and associated issues, but many did not feel this was currently the case. Parents felt that if those they encountered in relation to child sleep (such as doctors, HVs, childcare or nursery staff) were better informed about up-to-date evidence, this would encourage parents to make more use of these resources. In addition, parents highlighted that in an ideal world, they would like improvements to the interpersonal skills and approachability of HCPs.

For some parents, the potential role of sources which they regularly visited for other reasons was emphasised as being underutilised with respect to child sleep. Children's centres were considered to be a resource that could (and in some cases did) combine formalised HCP provision alongside more informal support structures, such as other parents. A handful of parents reported that they currently utilised nurseries or childcare provisions for child sleep support, although more mentioned that they would like to do so. Parents noted the value of the fact that staff in these organisations knew them and their child, and as many staff would already be dealing with their child's sleep during the day, they could also be of potential further assistance for information, advice or help for child sleep at home.

Theme C. Sources offer a more balanced view of options or approaches

A strong theme which emerged was that parents desired sources to offer information about a broader range of approaches and intervention methods. Parents ideally wanted to be able to access a broad and balanced view of the options available to them, which reflected differences between families in approaches to parenting, as well as broader social and cultural differences. While this theme predominantly focused around a desire for a balanced view of the range of intervention methods available, it also related to desiring specific but balanced information for different types of CSPs at different developmental stages.

Theme D. Access to a sleep specialist

One of the ways that parents felt existing provision could be improved would be to ensure free access to a sleep specialist was available. Many parents felt that this support was currently lacking, and that quicker access or referral to a specialist could help parents and other professional providers whose knowledge of child sleep is not comprehensive, to ensure that any family who requires additional help and support can access it.

Theme E. Increase parental knowledge, training, and access to training

Parents suggested provisions for child sleep could be improved by increasing the availability of parental education about child sleep. Many parents did not feel there were specific outlets where they could obtain useful information or training to enable them to develop their knowledge about child sleep. Some parents specifically identified that courses or educational programs would be beneficial to them, but did not know how to access such training. Some parents felt that there were no suitable options available to them to currently to help improve their knowledge. Many parents felt that by better educating parents on what was normal and to be expected from child sleep, they would be better prepared to deal with any CSPs. In addition, parents reported that there should be specific training for parents whose children have CSPs to help support them in dealing with these difficulties. Some parents reported that classes and courses they had attended had been incredibly useful to them, but many stated that these were limited in their availability, or costly.

4.4. Chapter summary

This chapter has presented results relevant to the overall aim of this study, which was to investigate the help-seeking behaviours and experiences of parents of infants and toddlers in relation to their child's sleep. The sleep of children in the sample was explored, including the prevalence of CSPs based on parental report and a research definition, and differences in child sleep across these definitions of CSPs. Parental knowledge about child sleep and its relationship with child sleep was presented.

Details of parents' help-seeking behaviours were documented. This included the presentation of parents' preferred source use and key themes about what parents found most useful about sources, as well as the range of parental reservations and barriers to using sources generally as well as specific types of sources. Parental preferences, barriers, and experiences of different types of treatment method were also highlighted, along with a description of the reasons why some parents choose not to seek help or support for child sleep. This chapter concluded with the presentation of differences between parents' actual current source use and their ideal source use for information, advice or help for child sleep as well as parentally reported desired improvements to existing sources or resources that would be beneficial. The subsequent chapter of this thesis will present a discussion of these findings in relation to the existing literature on the topic.

Chapter 5

Study one: Discussion

This chapter will offer a discussion of study one findings. Firstly, a brief summary of the results will be presented, followed by an integration of the key findings with previous literature. Limitations pertinent to this research and suggestions for future research will be offered, and the chapter will culminate with a brief conclusion.

5.1. Summary of results

Sleep behaviour across the child age groups demonstrated an expected change that occurs in child sleep, in line with development through infancy and toddlerhood. Different proportions of children were classified as having a CSP based on parental report and research definitions. Differences were apparent across various aspects of child sleep behaviour between children who did and did not meet definitions of CSPs, as determined by both parental report and research definition. The methods parents used to settle their child to sleep appeared to be related to both definitions of CSPs.

In general, parents appeared to be fairly knowledgeable about child sleep. No significant differences were identified between level of parental knowledge

about child sleep and parents whose children were parentally reported as having a CSP. However, parents of children who met the research definition of a CSP exhibited reduced levels of parental knowledge about child sleep than those who did not meet the research definition.

Parental preferences for informal types of sources were highlighted, with HVs being the only widely used professional source. A range of reasons emerged which accounted for parental preferences and barriers to general and specific source use. Differences between parents' current and desired source use were identified, along with a range of ways in which parents perceived that existing sources available for child sleep could be improved. A range of treatments to improve child sleep had been suggested to parents, but there were differences in the proportion of parents who reported they had attempted each method and their perceptions of the success of methods varied.

5.2. Parental help seeking

The high proportion of parents (67%) who reported having sought, at least once, advice, information, or help for their child's sleep demonstrates the importance of the topic to parents. This supports previous findings that sleep is a prime concern for many parents of infants and toddlers (Porter & Ispa, 2013; Trajanovska et al., 2010). The proportion of parents who had sought help in the current study was comparable to the proportion of parents (64%) in another study, who reported sleep was one of the childhood complaints that they had sought help for (Trajanovska et al., 2010). However, in another previous study that sought to explore the nature of concerns raised online by parents, a smaller proportion (24.2%) posed questions about child sleep (Porter & Ispa, 2013). As this study only enquired about concerns that parents had raised online and this could explain the difference in the proportions of parents who reported seeking help for child sleep.

The proportion of parents who report seeking help or advice for child sleep are likely to be strongly influenced by the focus of individual studies and ways in which parents are asked about their concerns. This may account for differences in the rates reported in some other studies. Further, parents in the current study were asked about a range of different help-seeking behaviours, ranging from

general information seeking about normal child sleep to seeking treatment for severe CSPs. Different sources might meet parents' needs, to varying degrees, depending on their specific issue. Irrespective of this, it was clear that the information, advice, and help currently available is fragmented and that many parents were not clear on who or what might be available or useful to them.

5.3. What sources did parents use and why?

There was a wide range of sources available to parents, and the results of study one highlighted that there was variation in how parents experienced and perceived these different sources and their quality. As in previous studies, there was a trend in the current study for parents to make use of a range of sources of a more informal nature and few used healthcare professionals (HCPs) and their associated sources for information or help for child sleep (Tsai et al., 2014; Stremler et al., 2013). Previous evidence was based on parents from Taiwan and Canada with younger children of up to 3 months (Stremler et al., 2013; Tsai et al., 2014). Even though the sample sizes, age of the children included, cultural settings, data collection and analysis methods differed, the current study identified that a similar pattern of parental help seeking was consistent for UK parents across a much broader age range.

The informal types of sources preferred by parents' included friends, other parents, family members, general Internet searches, and online resources. Parents commonly relied on multiple sources of a more informal nature, mainly to access other parents' anecdotal experiences or subjective opinions. Like previous results, parents in the current study respected or desired information from other parents or those whom they deemed to have relevant hands-on knowledge or experience of the topic in question (Tsai et al., 2014; Brady & Guerin, 2010). Parents appeared to feel that information obtained from such sources provided more honest accounts of the reality of parenting, in comparison to a more generic or unrealistic account that many expected to receive from professional sources or services, such as Health Visitors (HVs).

In the current study, general Internet searches were the most commonly used source by parents of 6-36 month olds. This suggests that parents' increasing use of online or Internet resources to seek health information for children is also

evident in how parents seek information or help for child sleep (Khoo et al., 2008; Allen & Rainie, 2002). While many parents commonly used sources of an informal nature, as other studies have found, many parents also made use of HCPs (Henderson et al., 2013; Trajanovska et al., 2010), although HVs were the only widely used HCP source across the age groups in the current study. However, what is less clear from the current study is whether parents had actively sought out information or advice on sleep from HCPs, or if sleep issues were just raised informally or coincidentally during routine visits.

Interesting differences were revealed between parental source use across different child age groups. Parents of 13-24 month olds made the most use of sources. It may be that parents are most troubled or concerned about their child's sleep at this age. Internet based resources were popular across all age ranges, although trusted website use was noticeably reduced in parents of 6-12 month olds. There was also increased use of HCPs, specifically doctors and surprisingly midwives, in parents of 25-36 month olds. It may be that parents of children in this age group accessed these professionals informally in the community or that they sought out trained professionals after having unsuccessfully tried other sources. Alternatively, it might be the case that they were concerned about on-going issues with their child's sleep. Current findings suggest that although parents might seek and also need different support depending on the age of their child, they overall appear to adopt a fairly consistent pattern of help seeking.

Limitations of parental use of informal sources

While parents held a preference for sources of a more informal nature, these types of sources have potential pitfalls for parents. Many were unverifiable in terms of the reliability and quality of the information provided. As with previous findings, results suggest that information obtained from unregulated or unverifiable sources, most notably the Internet, is of a vastly variable quality (Porter & Ispa, 2013; Scullard et al., 2010). Due to the vast quantity of information available online, parents would likely be able to find support for almost any opinion they might hold on a child health topic (Bernhardt and Felter, 2004). If support is identified for an incorrect or unsupported viewpoint,

parents may erroneously think that an inaccurate or even dangerous opinion is legitimate.

Similarly, if parents implement a sleep intervention, they may obtain information about specific methods from a range of sources. Behaviourally based interventions for CSPs have a strong evidence base (Meltzer & Mindell, 2014; Mindell et al., 2006) and would likely be the first and preferred treatment method recommended by healthcare services (Wilson et al., 2010). Yet to be successful, these types of interventions need to be used in appropriate circumstances, and be accurately and consistently implemented by parents. If information about treatment methods is obtained via reliable and evidence-based sources, these requirements would hopefully be communicated to parents. Yet information or advice from more informal source types may not fully explain the principles, steps, and potential consequences of the intervention. This may negatively impact upon the effectiveness of the intervention, and parents may erroneously consider the method to be unsuccessful, even if its lack of success was due to inappropriate implementation or use. Consequently, the use of sources of an informal nature, although widely used by parents, may not be optimal sources for them to access accurate information about child sleep.

5.4. What did parents want from sources?

Results clearly illustrated that what parents wanted from sources for child sleep was: a) information or advice that was in line with their parenting approach; b) to have access to information and advice which covered a broad range of approaches and methods, and allowed them to make personal decisions about which pieces of advice they were comfortable with and best suited their individual situation; and c) reliable and evidence-based guidance. However, many parents did not feel that current provisions met their needs, particularly those delivered by HCPs, which will be discussed more explicitly in section 5.5.

Current results clearly support previous findings which have highlighted that while efficacy is an important factor for CSP interventions, other aspects such as parental attitudes, acceptability of and agreement with methods, compliance, and parental understanding of how methods may impact the child and family

also need to be considered (Wiggs, 2007; Nobile & Drotar, 2003; Sadeh & Anders, 1993). Yet current results suggest that parents perceive the existing sources (particularly HCP resources) as not sufficiently acknowledging these additional factors. This is significant as providing well-researched and evidence-based resources and methods are redundant if parents avoid using these sources, are categorically against the principles of the information and techniques offered, or have misconceptions about the nature of the methods offered. The importance of ensuring parents are fully informed about the principles and techniques involved with any management suggestions is reinforced by the fact that nearly 30% of parents reported the reason they had not tried out method(s) that had been suggested to them to improve their child's sleep was because the principles of the suggestion were incompatible with their beliefs or desired parenting approach.

Many parents in the current study did not perceive that there was adequate specialised support available or accessible to them. If parents do not feel additional support is available to them, it is unsurprising that other more available sources, most likely to be informal in nature, are used. It is essential that appropriate pathways and specialists are available to parents, to either access directly, via signposting from other services, or from HCP referral to ensure suitable support is available to any parents who may require it. Encouraging parents to seek help may prevent some CSPs from becoming long-standing, persistent problems.

In addition to the nature of the source and information itself, another key aspect for many parents when seeking information or help was the availability of emotional support, re-assurance, and empathy. As has been noted in other research, one of the key reasons why parents in the current study reported making more use of sources of an informal nature was to receive social and emotional support (Bernhardt & Felter, 2004). This was compounded due to many parents reporting that HCPs exhibited poor interpersonal skills, which led parents to feel that emotional support and empathy were lacking.

A contradiction between what parents reported wanting and what they actually used was clear in the current study. Specifically, there was a strong

acknowledgement from parents of the importance of obtaining reliable information. Nevertheless, many parents appeared to rely on sources of an informal nature and some categorically avoided more professional resources, even though many parents noted that discriminating between the quality of information, especially for online resources, was challenging.

5.5. Barriers to parents seeking help and implementing treatment methods

General barriers

Some general barriers, which influenced parents' help seeking and/or implementation of treatment methods, clearly emerged from the current study. Some parents specifically reported that poor child sleep or CSPs were a social taboo. This is supported by previous research which has suggested that parental perceptions and expectations about child sleep, including what behaviours are deemed acceptable or problematic by parents and professionals, may be impacted by their social and cultural context (Jenni & O'Connor, 2011). There were clear perceived social pressures to have a child that slept well. Consequently, many parents suggested they would prefer to provide an inaccurate account of their child's sleep rather than admit or discuss their problems.

It appeared that this desire to conceal any CSPs stemmed from fears of firstly being viewed negatively or judged by others, and secondly being inundated with unwanted suggestions from others on how they could or should manage child sleep. This could account for why many parents preferred informal sources, as these could be used anonymously and parents may feel they would be less likely to be judged. Improving parental understanding about child sleep may help to normalise child sleep at different developmental points and educate parents about potentially problematic sleep behaviours and possible management options.

For some parents, how well their child slept was seen as a reflection of their parenting competence. This may account for why some parents reported feeling that there was an element of competition between parents relating to child

sleep. Interestingly, however, a minority of parents who deemed their child's sleep to be 'good' acknowledged the challenges or social pressures around child sleep and reported that they actively avoided discussing the topic with their peers, for fear of upsetting or offending those who were struggling.

Barriers to implementing treatment methods

Some specific barriers to parents' understanding and use of intervention methods were clear. There was an apparent lack of consistency in the use and understanding of some key terminology. Parents used a number of different terms to describe behaviourally based methods, and terms such as 'cry it out', 'controlled crying', and 'sleep training' were often used interchangeably even though these terms refer to different things. The umbrella-term 'sleep training' was also used in a manner which suggested that parents believed this term informed about the nature or content of the intervention itself. For the majority of participants, their use of terms relating to sleep training and behaviourally based intervention methods were used in a negative manner or were directly associated with negative connotations. Our results appear to support Price, Wake, Ukoumunne, and Hiscock (2012a), who reported that parental concerns about the traditional, purely extinction based 'cry it out' method have also been erroneously applied to the full range of behaviourally based methods.

Many parents did not appear to be aware that there is currently no empirical evidence base to suggest that any forms of behaviourally based methods are damaging, in the short or long term, to children, parents or their relationships (Gradisar et al., 2016; Price et al., 2012a). As has previously been found, many parents did not agree with the principles of, or want to undertake, behavioural interventions due to concerns about the nature of the method and potential negative long-term effects on the child regarding attachment, emotion, and development (Mindell, Leichman, Puzino, Walters, & Bhullar, 2015; Blunden & Baills, 2013; Tse & Hall, 2007).

It is possible that at least some of the aversion to 'behavioural methods' shown by some parents in the current study arose as a result of not being fully aware of the fact that there is a range of behavioural techniques. It is important to ensure that parents, professionals and, where possible, the broader media and authors of sources are well educated about the principles of behavioural

interventions, the range of techniques, and what is known about their impact (on child sleep and other child and family factors). Improving knowledge about child sleep interventions may function to reduce apparent misunderstandings which appear to negatively impact parents' decisions about appropriate management options for child sleep.

Barriers relating to the use of HCPs

Parents raised specific barriers to HCP use. In the UK healthcare system, HCPs and particularly HVs are likely to be one of the only trained individuals alongside doctors who have regular scheduled contact with families in the prenatal and early childhood period. These contacts provide an opportunity for parents to share their concerns about their child, as well as for HCPs such as HVs to identify families who may require additional support around a range of issues that may include sleep (Hanafin, 2017; Local Government Association, 2017). However, a particularly startling result was that only around a quarter of parents reported having discussed sleep with their child's HCP. Whilst HCPs should perhaps be asking parents about their child's sleep, it is equally surprising that parents themselves do not appear to be raising these issues more frequently with their HCPs, given that sleep is a primary concern reported by many parents (Mindell et al., 2006; Mindell et al., 1994).

A potential explanation for why parents are not raising child sleep issues with their HCPs is that many HCPs were perceived by parents to lack appropriate training and knowledge about child sleep. This perception appears to be supported by empirical evidence, which suggests that nearly half of HVs reported they had received little or no professional training about the prevention and management of children's sleep problems (Netmums & Institute of Health Visiting survey, 2012). It is perhaps unsurprising therefore that HVs in the UK also reported having a lack of confidence in evaluating and/or treating child sleep (Netmums & Institute of Health Visiting survey, 2012). Evidence from outside of the UK has also identified similar inadequacies in HCPs' training and confidence about child sleep (Honaker & Meltzer, 2016; Mindell et al., 2013; Faruqui, Khubchandani, Price, Bolyard, & Reddy, 2011; Schreck & Richdale, 2011; Mindell & Owens, 2003). If HCPs such as HVs lack training, knowledge, and/or confidence about dealing with child sleep issues, it is unlikely they would

be able to adequately or confidently assess and make appropriate recommendations to parents. Further, the current study highlighted that a single negative experience, or even hearsay of another parent's experience, reduced parental confidence in HCPs' competence, resulting in less use of these sources in the future.

There also appeared to be a tension between the type of help and treatment methods that parents desired and what they anticipated they would be offered by HCPs. Similar to previous studies, results of the current study suggest HCPs face challenges in delivering evidence-based information to parents in everyday practice (van Bekkum & Hilton, 2013). One of the main issues for parents was the perception that HCPs were limited in terms of the breadth of information and advice they could or would offer. Specifically, many parents in the current study reported desiring gentle or attachment parenting based methods, not behaviourally based interventions, but it was the latter which most parents had experienced or perceived they would be offered by HCPs.

There is clearly a tension between meeting parents' needs within the practical constraints of the healthcase system. HVs report they are operating with reduced financial resources and increased workloads (IHV, 2016). Clearly, reduced funding and increases in workloads are likely to negatively impact upon the mandated and additional services that HVs are able provide to parents. However, if parents had access to better sources of lower level information, they may not need to see their HCP in relation to sleep at all, which may free up already limited HCPs time for the range of topics and checks they are required to address.

Parents also highlighted fears about being judged or not listened to as a common barrier to seeking information or help from HCPs. Some parents reported that HCPs appeared dismissive or patronising of parents' worries, and the stance employed by some HCPs in interactions with families resulted in some parents feeling they were instructed on what they should be doing, which limited any discussions about the full range of management options (Middlemiss, 2013). The need for HCPs to have good quality interpersonal skills which foster reciprocal trust and suggest empathy is emphasised, given that

current results clearly demonstrate how past negative experiences of a source influence decisions about future use of the source. This is critical given that some parents were put off using these types of sources due to hearsay which suggested other parents had been dissatisfied with the attitude and/or advice delivered by their HCP. Further, some parents held concerns about possible repercussions of admitting to HCPs that there was a problem (e.g., that their child's sleep problem would be construed as reflecting a deficiency in their parenting ability).

Similarly, a number of parents felt that seeking help or support from HCPs would be viewed as time wasting. There were also parents who pre-judged that attending a HCP appointment for CSPs would be a waste of their own time. Clearly, these issues may need addressing in different ways. Implementing further child sleep education for HCPs and by public education could help to ensure that parents believe that HCPs will adopt an understanding and sympathetic attitude. Giving parents confidence may be particularly relevant if parents are fatigued or sleep deprived, which is common for parents of infants (Insana & Montgomery-Downs, 2013). Sleep deprivation can have a profound effect on aspects of functioning, including anxiety, mood, and stress (Babson et al., 2010; Meltzer & Mindell, 2007), and may negatively influence parental perceptions of HV interactions**.** However, solutions to these problems may not be easily achieved, as they would likely require additional contact time, which may not be feasible given the financial and workload constraints that many HCPs operate under.

5.6. How could the difference between what is available and what is used by parents be addressed?

Findings clearly suggest, in line with previous research, there are gaps between what is available to parents and what they make use of (Tsai et al., 2014; Blunden et al., 2004; Morrell, 1999). Our findings extend previous research by highlighting potential reasons for these differences. What parents wanted from sources has been discussed in section 4.3.4. Given the variability in what parents want, the ideal would be to have a range of different resources which could be effectively delivered in different ways.

A well-informed HCP or a suitable website or Internet resource could both be used to deliver a diverse information. Using the Internet to deliver interventions or treatments has been trialled successfully in paediatric sleep populations (Mindell et al., 2011a; Mindell et al., 2011b). This suggests it may be possible to develop resources that better meet parents' needs. Parents' desire for easily accessible, evidence-based information about a broad range of approaches is exemplified by online resources such as Unicef's Baby Friendly Initiative (n.d.). The information provided in Unicef's online material includes broad advice and guidance for caring for children at night, based on evidence-based approaches to feeding, settling, and to an extent, crying. While the initiative does not recommend co-sleeping, it does recognise that some parents may co-sleep with their baby, for various reasons, and provides key safety advice if parents choose to adopt this sleeping practice. This illustrates how evidence-based methods can be recommended whilst acknowledging differences in parenting styles. This approach ensures parents are well informed with appropriate information, and that there is support for parents who choose to make alternative choices.

A number of sleep specialists and groups who have an interest in supporting families with child sleep have begun to develop websites, such as babysleep.com and Infant Sleep Information Source. These websites provide a comprehensive range of resources for parents which are evidence-based, including information about normal sleep and a wide range of different management and treatment options, as well as providing answers to key questions raised by parents. Some parents may find that clear, well-evidenced websites such as these would meet their needs. However, these are not currently widely used or systematically recommended to all parents. There is also currently limited information about the use and effectiveness of these sites. If they are useful, it could be that making parents aware of such resources during routine prenatal and or antenatal appointments or classes would be beneficial.

While a comprehensive and evidence based website may provide adequate support for some parents, others may require additional information, help, and/or support, including from an emotional perspective. The logical resource to deliver this sort of support would be HCPs. However, given the financial and

time constraints which HCPs are under, it is unrealistic and perhaps unnecessary for all parents to need to seek help from HCPs. Some parents could adequately (and may even prefer to) acquire information, advice, or even treatment suggestions online. Another approach could be used to achieve the overall aim of providing broad, accessible, and evidence-based support. A previous study has trialled a 'call in service' in an attempt to deliver evidence-based advice to address common parental concerns, including sleep. This involved parents voluntarily calling the service and having the opportunity to ask questions related to any developmental, behavioural or emotional features in their child. Parents received evidence-based, practical advice and guidance from the service, and overall feedback suggested the service had positive outcomes for parents and children (Polaha, Volkmer, & Valleley, 2007). However, given the extensive resources required for such a service, a comprehensive website and/or supporting materials such as those highlighted above could be a suitable alternative.

Perhaps even more appropriate and realistic would be a tiered system, at the lowest level providing a well-evidenced website full of information across a range of sleep-related issues and topics covering a range of different approaches to management, but also including information about how and where parents can, if required, obtain further help, advice, and information. Also important could be improving the knowledge and training of HCPs and/or the resources to which HCPs can refer parents to. Increasing the accessibility and availability of training material for parents in relation to child sleep may result in more parents becoming better informed, and in turn able to develop healthy sleep habits in their child and further reduce the potential numbers of families requiring HCP or specialist help.

5.7. The presence of child sleeplessness problems

Similar to previous findings, the proportion of children defined as having a CSP varied when different criteria were used (Sadeh, 1996). In the current study, CSPs were present in 46.3% of children when parental report was employed and 22.2% when the research definition was employed. The rates of parentally reported CSPs are higher than the 10-25% that has previously been reported in US and Australian samples, and the 22.6% that has been reported by UK

parents of children of a similar age range (Byars et al., 2012; Mindell et al., 2010b; Sadeh et al., 2008; Wake et al., 2006). The prevalence of parentally reported CSPs is less than the 93.91% reported in one previous Israel based study (Sadeh, 2004), but the author suggested that apparent high prevalence rates may have been due to the fact that parents whose children had a CSP may be more likely to participate due to having an interest or holding concerns about child sleep. Such an explanation may also be relevant to the current sample, although the rates of the presence of parentally reported CSPs do not appear to suggest this was the case.

The proportion of children (22.2%) who met the research definition of having a CSP in the current study appears fairly typical of prevalance rates, albeit slightly higher than the 17% and 10% obtained in previous studies using this or similar measures (Byars et al., 2012; Morrell, 1999). However, current study presence rates are comparable with the 10-21.2% prevalence of CSPs identified in 8-24 month old Australian children (Wake et al., 2006). The parental report definition suggested 24% more children had a CSP than when the research definition was used. A possible explanation for the discrepancy between the rates of CSPs detected by parental and research definitions might relate to the severity of the problem. In the current study, parents were considered to perceive their child to have a CSP if they rated their child's sleep to be anywhere between 'a very serious' or 'a small' problem. However, it may be that 'a small problem' do not necessarily meet the research definition for a CSP.

The sleep patterns of children categorised as having a CSP (by either definition) differed from those with no CSP, suggesting that both of these criteria may distinguish between good and poor child sleep. Similarly, a number of children who were not parentally reported to have a CSP did actually fulfil the criteria for a research definition CSP. Therefore, an alternative explanation for the discrepancy between the presence of CSPs based on parental and research definitions may be that parents base decisions regarding the nature of their child's sleep on broader factors than the frequency and duration of sleep disturbance, which are the only features assessed as part of the research definition. For example, the research definition makes no allowance for a child's behaviour during any wakeful periods and it may be that it is the nature of their

child's behaviour during wakefulness, rather than the frequency or duration of the wakefulness itself, which is most related to parental decisions about what is, and is not, deemed problematic. Furthermore, as highlighted in section 1.1.3.1. there are also factors unrelated to child's sleep that have been found to be associated with parental perceptions of child sleep. These include parental aspects such as psychopathology, cognitions, perceptions of poor daytime functioning and sleep quality, or fatigue, factors in the child, as well as broader social and cultural expectations, (Loutzenhiser et al., 2015; Dayyat et al., 2011; Sadeh, Mindell, & Rivera, 2011b; Morrell, 1999; Sadeh, 1994). Ultimately, the results of the current study suggest that different CSP definitions may describe different aspects of child sleep and that parents do not necessarily view all aspects of child sleep in the same way.

Links between settling method and child sleep

Being fed to sleep was associated with children having a CSP when both a parental and research definition was used. Conversely, being settled in bed alone was associated with children not having a CSP by either definition. Therefore, as in previous research, the current findings suggest links between the methods used to settle children and the child's sleep; specifically, that poorer child sleep (categorised by either CSP definition) is associated with children who were settled to sleep with high amounts of parental involvement (Mindell et al., 2010; Touchette et al., 2005; Morrell & Cortina-Borja, 2002; Adair et al., 1991). While the different definitions of CSPs assess different aspects of child sleep, as has been highlighted, both differentiated between use of parental settling practices that are known to be associated with child sleep.

5.8. Parental knowledge about child sleep

On the whole, parents in the current study appeared knowledgeable about child sleep; there was awareness of the potential for sleep to be related to their child's daytime functioning, and many parents strongly emphasised the importance of sleep for their children. These results are contrary to previous studies that have found parental knowledge about child sleep to be generally poor (McDowall et al., 2016; Owens et al., 2011; Owens & Jones, 2011; Schreck & Richdale, 2011; Reich, 2005). However, previous studies originated predominantly from outside of the UK and included parents of children of a

much broader age range, and so may not be directly comparable to the current study.

There remained a sizable proportion of parents in the current sample who could clearly benefit from additional information and/or education about child sleep. There appeared to be less consistent understanding about the potential impact of external factors on child sleep. In addition, many parents themselves reported that they did not feel well educated or knowledgeable about child sleep. In fact, as has previously been reported, many parents explicitly desired additional information regarding child sleep (Barnes et al., 2008). As a result of perceived lack of knowledge and as has been previously been found, many parents consulted sources with the intention to compare their child's sleep behaviour against other children's to ensure it was 'normal' (Bernhardt & Felter, 2004). If parents were not reassured, in many cases they sought additional information or help about their child's individual sleep behaviour.

The importance of educating parents about child sleep is further emphasised by the association between poorer parental knowledge about child sleep and poorer child sleep (as assessed by the research but not parental report definition of a CSP). This suggests that parental knowledge may in some ways be impacting upon actual child sleep. In addition, the main reason parents who had not sought advice, help, or treatment even when they considered their child to have a sleep problem was because they believed their child would grow out of any sleep problems. However, empirical evidence suggests that in many cases, CSPs persist in into later childhood (Byars et al., 2012; Lam et al., 2003; Morrell & Steele, 2003). Yet arguably if parents' knowledge or understanding of child sleep is poor, they may not be able to recognise and identify problematic child sleep behaviour or when transient CSPs persist into something more serious.

Therefore, it appears it may be beneficial to improve the quality and/or quantity of information about child sleep that is both available and delivered to parents. Previous studies have successfully demonstrated that parental knowledge about child sleep can be improved through delivering developmentally appropriate information and advice (Jones et al., 2012; Mindell et al., 2006).

Improving parental knowledge about child sleep has also been found to have a positive impact not just on child sleep, but also on a range of secondary outcomes including maternal tension, depression, fatigue, and mood (Jones et al., 2012; Mindell et al., 2011a; Adachi et al., 2009; Kerr et al., 1996). Improving parental knowledge and access to sleep education could better equip parents with the understanding, tools, and confidence in approaching their child's sleep. Doing so may contribute to parents developing healthy sleep habits in their child and knowing when, if necessary, to seek further help.

5.9. Limitations

The results of the current study need to be considered in the context of some limitations.

Due to the lack of a standardised questionnaire to assess some of the aspects considered, a questionnaire was devised specifically for use in this study. This included the development of questions to assess parental help-seeking behaviours, and the modification of questionnaire items, designed for use with adults, to assess parental knowledge about child sleep. It is possible that these questionnaires did not fully capture or reflect the subtleties which exist in parental knowledge about child sleep and their help-seeking behaviours. Further development and refinement of assessment tools, in the light of the results of the current study, is required.

There is the potential for sample bias as the current sample size was relatively small and comprised mainly mothers who were predominantly white, of above average education, and socio-economic status. The majority of parents who completed the questionnaire based their responses on their only or oldest child. It is possible that differing levels of parental experience with other children may impact upon general parental knowledge about child sleep, preference for sources, and/or willingness to engage with specific services or intervention approaches. In addition, while the study was open to all UK parents, some geographical areas were under-represented. For example, rural Scotland and Wales were represented by only a handful of parents; results may not therefore be considered representative of the whole of the UK. This geographical aspect may be important to consider in future research, as local service provision is

likely to vary across the country and may influence help-seeking behaviours. The online questionnaire used in this study relied on participants having access to the Internet, and participants self-selected to participate. Therefore, parents who had limited access to the Internet may not have participated, so results may not accurately reflect help-seeking behaviours of parents with limited Internet access. However, future studies could also deliver this type of questionnaire over the phone or through interviews to explore whether the method of delivery does impact upon the results.

The current sample was not recruited to be representative of parents who favoured or avoided specific approaches, parenting styles, or treatments for CSPs. However, as recruitment involved snowballing, parents with similar parenting philosophies may have shared the questionnaire with their peers, which could result in parents who favoured certain types of approaches being over-represented. Therefore, current results may not accurately reflect those of the general population.

Children were not recruited based on any specific aspects of their sleep, so the sample is not necessarily representative of children with typical sleep in each of the age groups considered. However, when considered developmentally, children's sleep appeared to follow an expected, naturally occurring trajectory, whereby as children got older they increasingly went to sleep later, slept longer overnight, spent less time napping during the day, and woke less frequently, as well as for a shorter amount of time overnight (Galland et al., 2012; Sadeh et al., 2009; Acebo et al., 2005; Sadeh, 2004). There were some differences in sleep between other samples and children in the current study. In the current sample, the mean total sleep time for 6-36 month olds (12.14hrs) was less than has been reported (13.02hrs) for a large sample of 0-36 month olds from predominantly Caucasian countries (Mindell et al., 2010b). However, in the same study, night-time sleep duration (10.00hrs) was less than reported in the current study (10.49hrs). In the current study, there were also differences in child night-waking compared with previous research; on average, children were reported to wake more (1.84) than has previously been reported in studies of similar age ranges (0.8 and 1.13) (Galland et al., 2012; Mindell et al., 2010b). However, the exclusion of newborns from the current study, whose sleep is

categorically different from older children, may account for these differences. Although there were minor differences across specific aspects of child sleep behaviour, on the whole the children in the sample did not appear to have substantially different sleep patterns from those whose data have been reported in the range of studies above. Further, differences are not overly surprising given the variability in child sleep behaviour illustrated by the current and previous studies (Galland et al., 2012; Mindell et al., 2010b).

The age of the children included in this study was broad, covering 6-36 month olds. As child sleep changes rapidly during the early years of life (Acebo et al., 2005), attempts were made in the current study to split children into appropriate age bandings when analysing their data. However, there may be parental help-seeking behaviours that are distinct to specific age groups, which were not sufficiently highlighted by this study. Future studies could extend knowledge of UK parents' help-seeking behaviours by examining similarities and differences in these behaviours across different age groups of children. Investigating age-related differences is important, as it is likely parents may require and seek different information across a child's early life. For example, the information and support desired by a parent of a 6-month-old may differ to what is required by a parent of a toddler, and this may differ again for a pre-school aged child. In addition, if parental help-seeking behaviours across childhood can be elucidated, this may have implications for the future development of resources.

Finally, due to the vast number of individual sources parents reported having used within each broad category (e.g., different websites, HCPs, and books) no attempt was made to specify, describe, nor evaluate each resource individually. It is highly likely that the quality of individual sources within each category would vary, and therefore results do not apply to all individual resources within each broad category (e.g., all websites, HCPs, etc.). However, given that very little is understood about UK parents' help-seeking behaviours, this study makes a valid contribution to existing knowledge as an initial exploration, suggesting there is a need for further, more detailed investigation of the topic. It is worth noting that it is possible that existing resources (online resources, websites, books, and leaflets) may adequately address the issues raised by parents in the current study, and that these resources are just unknown to some parents (and

professionals). If this is the case, new resources may not necessarily need to be developed, but existing resources may be able to be adapted to best meet parents' needs. In addition, resources may need to be more systematically recommended to parents to ensure they are being effectively identified and accessed by parents who may find them useful.

5.10. Future studies

Several possible ideas for future research have already been mentioned in the discussion. Future studies could also seek to extend our preliminary exploratory study by examining parental help-seeking behaviours in a larger, more demographically and geographically representative sample. This would help to ensure that results are more applicable to the general population, and are not skewed by any of the factors outlined above. In addition, this may allow any differences in the quality and availability of local resources to be more clearly identified. It could also be beneficial to recruit a sample of parents who more explicitly did and did not adhere to specific parenting approaches or methods to manage their child sleep, in order to identify whether these differences influenced parental help-seeking behaviours.

The current aim was to explore parental (mothers and fathers) help seeking, however as has been common with previous research studies in this area, most respondents were mothers. Whilst this has provided a wealth of data to explore general parental help-seeking behaviours, it would be beneficial for future research to more explicitly explore both maternal and paternal help seeking. There may be differences in patterns of behaviour and/or sources used by mothers and fathers. There may also be motivations, preferences, and barriers to seeking help and using different resources, which vary between mothers and fathers. In addition, within each dyad, parental agreement or discordance regarding the best sources or approach to seeking help may influence help-seeking behaviours, and requires future investigation.

Child sleep is clearly a significant issue for many parents, as evidenced by the large amount of qualitative data obtained from our open-ended questions. Future research could extend understanding of parental experiences of seeking information or help for child sleep through conducting interviews. This would

allow in-depth exploration of parents' preferences, concerns, barriers, and experiences of seeking information or help for child sleep. There is a need to increase understanding of the context driving their behaviours, opinions, and attitudes, as well as need for more detailed description of their experiences.

There was no existing tool available to assess parental experiences and opinions of existing resources, so it would be beneficial to develop a brief tool based on the types of themes and/or issues identified in this study. Such a tool could allow assessment and evaluation of sources to ensure that they are effective in meeting families' needs. This could allow researchers and/or policymakers to specifically identify areas in which parents could be better supported and, as a result, develop ways to adequately address these areas.

The current study focused on UK parents' help seeking, but to broaden existing understanding it may be useful to undertake further studies that compare parental help-seeking across countries and cultures. Such investigations may help to identify approaches which are used successfully in other contexts, and which could be incorporated into existing services elsewhere. In addition, understanding and acknowledging culturally specific aspects of parents' beliefs and/or approaches to managing or treating child sleep is important for ensuring that appropriate support can be provided to all families.

This study focused on CSPs but there are other ways in which child sleep can be disturbed (e.g., sleep disorders with other primary symptoms such as excessive sleepiness or parasomnias, sleep disturbance in association with medical or psychological conditions). It is important to understand parental help seeking to the fullest extent, and so future studies could explore different types of sleep disturbance and how this relates to parental help-seeking behaviours.

The aim of the current research was to obtain parental perspectives and experiences relating to help seeking for child sleep. Given that many parents felt that existing healthcare services and HCPs were not meeting their needs, future studies could explore HCPs' perceptions of the provisions available to support parents. Based on current findings, this should include exploring HCPs'

perspectives of the knowledge and training received for child sleep, and identify any barriers to supporting parents in the best way.

5.11. Conclusion

Results of the current research have contributed to and extended the existing literature investigating parental help-seeking behaviours by identifying preferences, barriers, and experiences of UK parents in relation to infant and toddler sleep. Results revealed that parents make use of a wide range of sources and that these are commonly informal in nature, with HVs being the only HCP who were widely used. Results also highlighted parentally perceived benefits and limitations of different source types. Many parents did not feel that existing sources adequately met their needs. Parents wanted a range of easily accessible, evidence-based information provided by someone with relevant experience, but also the freedom to make an informed decision and select only what was deemed to be in line with their desired approach to parenting and suitable for their individual circumstances. Ensuring that future resources, whether in the form of online resources and/or clinical services, overtly acknowledge parental desires and preferences is essential to best meet parents needs. While this approach could be challenging, it is essential to help maximise the number of families who can access and benefit from appropriate support.

5.12. Chapter summary

This chapter has considered the key findings of study one in relation to the broader literature on the topic of parental help seeking. Potential implications of these findings, as well as potential limitations and directions for future research were offered. The following chapters move on to present a brief background, methods, results, and discussion for study two, which explored the role of parental cognitions, knowledge, bedtime behaviours, and their role in child sleep.

Chapter 6

Study two:

Parental cognitions, knowledge, sleep-related practices, bedtime behaviours, and child sleep

The first section will provide a brief summary of what is currently known about the relationship between parental cognitions, bedtime behaviours, and child sleep, as well as highlight the limitations of existing literature, which forms the rationale for the current study. The second section of this chapter presents methodological details relevant to the study.

6.1. Introduction

As has been discussed extensively in chapter 2, certain parental cognitions about child sleep and bedtime behaviours parents use with their child are linked to poorer child sleep (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Mindell

et al., 2010a; Sadeh et al., 2009; Sadeh et al., 2007; Morrell, 1999). Results from previous studies, which explored these aspects and how they may interact, suggest that certain types of parental cognitions about child sleep influence the bedtime behaviours that parents employ (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Morrell & Steele, 2003; Morrell & Cortina-Borja, 2002). In turn, parental bedtime behaviours, predominantly those that involve higher levels of parental involvement, have been linked to poorer child sleep (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Morrell & Steele, 2003). Consequently, it has been suggested that the relationship between parental cognitions and child sleep may be mediated by the parental bedtime behaviours parents employ.

However, as noted in chapter 2, research in this area has various limitations, including the fact that it has almost exclusively focused on mothers and largely overlooked the potential role of fathers (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Johnson & McMahon, 2008; Morrell & Steele, 2003; Morrell & Cortina-Borja, 2002; Morrell, 1999). In the small number of studies which have analysed both maternal and paternal data, differences between mothers and fathers have been identified both in the cognitions held by parents and their relationship to child sleep (Ng et al., 2013; Tikotzky et al., 2010; Sadeh et al., 2007). Such evidence emphasises the importance of considering the role of both parents when researching influences on child sleep, hence the consideration of both maternal and paternal variables in the current study.

Existing research has also focused exclusively on parental cognitions that relate to the child's sleep (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Morrell, 1999). Yet parents may hold other types of cognitions that may also be relevant, such as those relating to their own sleep or their broader thoughts about sleep. It is essential to explore the different types of cognitions parents may hold, as it is plausible that parents who hold dysfunctional cognitions about their own sleep or about sleep more generally may also hold, or be more susceptible to developing, maladaptive, dysfunctional or negative cognitions about their child's sleep. Therefore, the relationship between parental cognitions about their own sleep and about their child's sleep was of interest in the current study. In addition, it is well known that cognitions, particularly

dysfunctional beliefs about one's own sleep, are linked to poorer sleep in adults (Harvey, 2002; Morin et al., 1993). Therefore, the relationship between parental cognitions about their own sleep and their objectively measured sleep (in primary night-time caregivers [PNCGs]) was also explored. Further, it was of interest whether the ways in which parents think and behave in relation to their own sleep is connected to the ways in which they think and behave in relation to their child's sleep, as well as whether these factors impact on their child's sleep.

In addition, chapter 2 highlighted a clear association between parental bedtime behaviours and child sleep; extensive parental involvement was linked to poorer child sleep (Mindell et al., 2010a; Johnson & McMahon, 2008; Morrell & Cortina-Borja, 2002). Given this link, parental bedtime behaviours were assessed in the current study. However, broader types of behaviours and approaches to managing child sleep may also be important. For example, parental endorsement of appropriate bedtime routines, good sleep hygiene habits, and appropriate child sleep environments have all been suggested to be associated with better child sleep (Mindell et al., 2009a). Therefore, an assessment of broader parental sleep-related practices were also considered in the current study.

The transactional model, which was extensively described in section 1.2.3.3, is a theoretical model of child sleep-wake regulation which highlights the potential influence of a variety of intrinsic and extrinsic factors, as well as parent-child relationships and broader environmental factors in child sleep. The possible interactions and bi-directional links between different factors, which ultimately may impact upon child sleep, are clearly highlighted (Sadeh & Anders, 1993). The model indicates that parental cognitions may drive how parents behave and respond to their child's sleep, such as the bedtime behaviours they employ (Sadeh et al., 2010). In this sense, parental cognitions and bedtime behaviours may mutually play a role in child sleep, among other factors, but cognitions may specifically function to influence parental bedtime behaviours. Both variables are therefore examined in the current study.

The transactional model has accounted for many different potential influences on child sleep-wake regulation. Some of these aspects such as child temperament, parental mental health, and parenting competence have been associated with parental use of particular bedtime behaviours and child sleep patterns (Johnson & McMahon, 2008; Bayer et al., 2007; Thome & Skuladottir, 2005; Lam et al., 2003; Morrell & Cortina-Borja, 2002). Therefore, a range of parental factors which may be important due to the possible influence on child sleep were considered in the current study. These included parental cognitions about child sleep and bedtime behaviours with their child, but also parental mental health, parenting competence, and child temperament.

Other aspects such as parental knowledge have as yet not been systematically investigated, but may need to be considered when exploring potential influences on child sleep. For example, previous research has suggested that parental knowledge about child sleep is poor and that this is associated with poorer parentally reported child sleep (Owens et al., 2011; Owens & Jones, 2011). However, these studies focused on broad child age ranges, and it is not clear if poorer parental knowledge about child sleep is associated with parental thoughts and behaviours relating to their child's sleep. The results of study one of this thesis suggested that there was a link between parental knowledge and whether parents considered their child to have a CSP. This raises the possibility that poorer parental knowledge about child sleep may influence parental cognitions and/or bedtime behaviours. Therefore, parental knowledge about sleep (both parental and child) was assessed in the current study.

Due to the potential differences between objectively measured and parentally reported child sleep, the relationship between these different measures was explored. In addition, how these different assessments of child sleep (objective by actigraphy and by parent report) were related to cognitions, knowledge, and sleep-related practice variables were investigated. One of the primary concerns highlighted by parents is the disruptive nature of CSPs. Therefore, this chapter will also explore the relationship between objectively assessed child and parental (the primary night-time caregiver, PNCG) sleep. Given the importance of consistency for establishing healthy sleep habits, this study will explore if congruence within a parent dyad for these different types of cognitions and

bedtime behaviours is related to the child's sleep.

Understanding the links between parents' thoughts about their own and their child's sleep, and their parenting behaviours and their child's sleep has theoretical implications for models of CSPs. Existing evidence for the role of fathers in the transactional model is limited, as is evidence regarding how parental behaviour links to child sleep. Therefore, findings may contribute to existing theoretical models of child sleep. Findings may also have potential clinical implications in terms of prevention (identifying children more at risk of developing CSPs) and management approaches (suggesting other possible targets of intervention) to improve CSPs.

The overall aim of this study was to extend previous work by exploring a range of parental (maternal and paternal) variables, including parentally held sleep-related cognitions, knowledge, and sleep-related practices, relating to their own and their child's sleep. This will include an exploration of the links between these variables (in mothers and fathers), and their overall relationship to actual child sleep. The predictive value of these different variables upon one another and on child sleep will also be explored. The specific aims of the study were stated in section 2.8.

6.2. Method

6.2.1. Participants

Participants were 46 mother, father, and child triads, this included 44 mothers and fathers as two families had twin children. The 44 mothers' ages ranged from 25-44 years (*M*=33.34 years, *SD*=4.24 years) and fathers' ages ranged from aged 24-55 years (*M*=35.12 years, *SD*=6.17 years, 1 father age missing). The key parental demographics of the sample are reported in Table 22. The child participants (males n=19, 41.3%) were aged 12-24 months (*M*=18.28 months, *SD*=3.93). The age range of 12-24 months was selected as this allowed the comparison of sleep variables from children with broadly similar sleep. For example, from 12 months there is a greater expectation (compared to earlier ages) that children in this age band will have a consolidated night-time sleep period (Galland et al., 2012). But, due to the developmental trend for increased individual variability of daytime sleep periods (in terms of presence

and duration) (Sadeh, Mindell, Luedtke, & Wiegand, 2009; Iglowstein, Jenni, Mollinari, & Largo, 2003), a lower upper age-limit than used in study one was also included, to limit the impact of developmental changes in 24 hourly sleep-wake distribution.

To be eligible for the study all family groups were required to include a co-habiting mother, father and toddler aged 12-24 months old at the time of the study and be based in Gloucestershire, Oxfordshire, or the surrounding areas. Parents were heterosexual couples to enable maternal paternal differences to be examined. No participating family member reported to suffer from a severe medical, developmental, or psychiatric condition, which could be expected to affect their sleep.

Past medical history of note was that two (4.3%) children were reported to have previously had food or dairy allergies, one (2.2%) eczema, and one (2.2%) an umbilical hernia. Parents were asked about current or recent (within the last month) child health, which is shown in Table 23. All medical complaints were managed or resolved and children had recovered from any ailments at the time of the study. The regular or current medication that was taken by children at the point of participating is shown in Table 23. A small number of children (n=10, 21.74%) were reported to have been currently or recently teething at the point of taking part in the study.

Table 22. Key parental demographic details of the sample

Maternal Education (n=44)		**Frequency (%)**
	Compulsory school	0
	College	2 (4.5)
	Vocational training or qualification (inc apprenticeships)	4 (9.1)
	University Bachelors degree	22 (50)
	University Masters degree	9 (20.5)
	Further postgraduate	7 (15.9)
Maternal Occupation (n=44)		
	Managers, directors, and senior officials	4 (9.1)
	Professional and technical	18 (40.9)
	Administrative and secretarial	3 (6.8)
	Caring, leisure, and other service	3 (6.8)
	Sales and customer services	3 (6.8)
	Student	2 (4.5)
	Full-time parent	5 (11.4)
	Other	6 (13.6)
Paternal Education (n=43)*		
	Compulsory school	4 (9.1)
	College	2 (4.5)
	Vocational training or qualification (incl apprenticeships)	6 (13.6)
	University Bachelors degree	16 (36.4)
	University Masters degree	6 (13.6)
	Further postgraduate	9 (20.5)
Paternal Occupation (n=43)*		
	Managers, directors, and senior officials	8 (18.2)
	Professional and technical	24 (54.5)
	Administrative and secretarial	2 (4.5)
	Skilled trade	4 (9.1)
	Caring, leisure, and other service	1 (2.3)
	Manual labour, process plant, and machine operatives	1 (2.3)
	Full time parent	1 (2.3)
	Other	2 (4.5)

*Demographic data from one father missing

The majority of children (n=40, 87%) were born at full term. Of those born prematurely (n=6, 13%), gestation ranged from 31-38 weeks (*M*=34.83 weeks, *SD*=3.31). Birth weight for the sample ranged from 2-pounds 15-ounces to 9-pounds 6-ounces (*M*=7.40, *SD*=1.71). Children of low birth weight were predominantly those born prematurely. At the time of taking part in the study, all children were reported to be healthy by their parents, as well as physically and developmentally typical.

Table 23. Children's current health and medication

Reported regular or current medication taken by children in the study (n=8)	
Iron supplements	2
Unspecified eczema medication	5
Antihistamine	2
Laxative	1
Topical steroid cream	1
Injuries, illnesses or ailments in last month (n=18)	
Cough or cold	14
Cold and ear infection	1
Chicken pox	1
Impetigo and hand and mouth disease	1
Thrush	1
Cold and ear infection	1
Reason child seen health professional in the last month (n=11)	
Vaccination/jab	2
HV sleep information	1
HV (regular scheduled visit)	2
Doctor for minor ailment	5
Physiotherapist	1

n=overall number of children who parents endorsed this response (multiple endorsements could be present for the same child)

Additional details regarding specific child demographics and familial sleeping arrangements were obtained for descriptive purposes, and are shown in Table 24.

Participants were recruited through various means for this study. The same recruitment sources were used as described in section 3.2.1 (study one). Some parents were also recruited through word of mouth or snowball recruitment. The participant information sheet for the study is displayed in Appendix 7.

Table 24. Child demographic details and familial sleep arrangements (n=46)

Child demographics	Frequency (%)
Child birth order	
Only child	26 (56.5)
Youngest	14 (30.4)
Middle	1 (2.2)
Oldest	1 (2.2)
Twin	4 (8.7
Number of children in the household	
Only child	26 (56.5)
2	16 (34.8)
3	2 (4.3)
4	2 (4.3)
Sleeping arrangements	
Child sleep arrangement	
Own room	33 (71.7)
Parents' room	4 (8.7)
Room with sibling	9 (19.6)
Child sleep In	
Cot	38 (82.6)
Own bed	8 (17.4)
Child sleep position	
Supine (back)	10 (21.7)
Prone (belly)	24 (52.2)
Side	12 (26.1)
Child bedding	
Blanket	7 (15.2)
Duvet	5 (10.9)
Sleeping bag	29 (63.0)
Other	5 (10.9)

6.2.2. Measures

Study two measures included a brief demographics interview, a questionnaire completed by both mothers and fathers, a sleep diary, and objective actigraphic recordings of the child and PNCGs sleep, all of which will be detailed in this section.

Family and child background

Family demographics interview

Interviews were conducted with the parent(s) at the first face-to-face meeting at the family home or other suitable location. They included questions about the child, including: age, sex, birth order, and family sleeping arrangements. Basic child health and medical details were also obtained, including any current or previous medications taken by the child, as well as details of any physical, mental, or developmental disorders. For the child demographic interview schedule, see Appendix 10.

Objective parent and child sleep

Actigraphy

Actigraphy is a widely used and accepted objective measure of sleep (Van de Water, Holmes, & Hurley, 2011; Sadeh, 2011; Sadeh & Acebo, 2002). An actigraph is a small wristwatch-like device that records movements. These movements can be used to infer sleep and wake. Actigraphy has been demonstrated as a reliable and valid measure of child behavioural sleep-wake patterns (Sadeh, Acebo, Seifer, Aytur, & Carskadon, 1995; Acebo et al., 1999).

The actigraph (Ambulatory Monitoring Inc. Motionlogger Mini) was worn by both the PNCG and child for 5 consecutive nights, based on evidence that this is an appropriate duration to provide representative data without being too intrusive or time-consuming for families (Acebo et al., 1999; Lam, Mahone, Mason, & Scharf, 2011). In accordance with convention, actigraphy placement for the PNCG was on the non-dominant wrist, and for children on the ankle (Sadeh & Acebo, 2002; Acebo et al., 1999; Sadeh, Alster, Urbach, & Lavie, 1989). The actigraph was worn from just before going to bed until shortly after awakening the next morning, and during this period movement was continuously monitored and the data stored in the actigraph.

The movement data was analysed using Sadeh's validated sleep scoring algorithm that distinguishes sleep-wake patterns (Sadeh et al., 1995; Sadeh, Sharkey, & Carskadon, 1994; Sadeh, McGuire, Urbach, & Lavie, 1989). Movements were scored in 1-minute epochs; all epochs that reach above a pre-set limit, assessed when the software applies Sadeh's algorithm to the data, are scored as 'wake' and any that score below this limit are scored as 'sleep'. To aid the interpretation of actigraphy data, PNCGs kept a sleep diary, for themselves and their child, for the same nights that the actigraph was worn. Sleep diary data included: the time the actigraph was put on and taken off; bedtime; sleep start time (if known); wake-up time; and get out of bed time. Any settling difficulties and the duration, and frequency of any night-waking were noted. Parents also recorded the frequency and duration of any daytime child naps.

Sleep onset, the start of actigraphically scored sleep, was considered to be the first epoch in the first 10-minute interval, where no more than 1 epoch is above the wake threshold (calculated by the software), after the time the participant reported getting into bed and settling down to attempt to initiate sleep (obtained from sleep diary). Any sleep disturbances were identified by more than 1 epoch being scored as wake in any 10-minute interval. Sleep offset (final waking time) was considered to be the final epoch in the last 10-minute period prior to 'wake-up time' (obtained from sleep diary) where no more than 1 epoch was scored as 'wake'. The final minute of this 10-minute period provided the sleep offset time.

Scores were averaged over the nights the actigraph was worn but excluded any unusual nights (for example if a participant was ill). Any ambiguous raw actigraphy data which did not correspond with the sleep diary or which could not be reliably interpreted following discussion with parents was omitted from analysis. In addition, actigraphy data from families who co-slept was also omitted due to the possibility that any parental or child movement may influence the others' actigraphic recordings (Meltzer, Montgomery-Downs, Insana, & Walsh, 2012). In addition, co-sleeping may result in interference of each other's sleep. For example, research using actigraphic monitoring has demonstrated that bed sharing partners can influence each other's sleep (Meadows, Venn, Hislop, Stanley, & Arber, 2005).

Various variables were derived from actigraphy data, including: *bedtime,* the time participant is in bed and attempting to initiate sleep, which was primarily obtained from sleep diary and validated by actigraphy*; sleep start time,* the time sleep was initiated; *sleep onset latency,* the time between bedtime and sleep start time; *wake-up time,* the time of final waking the next morning; and *get up time*, the time the participant got out of bed the next morning. Additional actigraphy variables regarding different aspects of the participants' sleep were also calculated. These included: *sleep efficiency,* percentage of time in bed spent asleep; *activity mean,* average amount of movement recorded between sleep start and wake-up time; *sleep minutes,* total number of minutes spent asleep between sleep start and wake-up time; *wake after sleep* onset, number of minutes participant was awake overnight between sleep start and wake-up time; *and sleep fragmentation index,* level of restlessness between sleep start

and wake-up time. Sleep fragmentation index, is calculated by the software and is a combination of; the movement index (calculated by the software) which illustrates the amount of movement exhibited during the night and, the fragmentation index, which is the number of wakes divided by the total sleep minutes multiplied by 100. The higher the sleep fragmentation index score, the more sleep is disturbed. In all data presented in this thesis, actigraphy variables and clock times are reported in decimalised format.

Parental questionnaire

The overall questionnaire comprised of multiple existing questionnaires, which included measures of: child sleep behaviour; child settling and night-waking problems; parental sleep quality; parental sleep practices relating to their own and their child's sleep; parental bedtime behaviours with their child; parental knowledge about adult and child sleep; parental cognitions about their own and their child's sleep; parenting competence; parental mental health; and child temperament. All of these are described in detail in this section.

Minor language adaptations were made to a small number of items in some of the questionnaires used, predominantly to improve the clarity of items for a UK audience and to ensure the appropriateness of items to the age range of children in the study. As any adaptations made were minor, these will not be discussed individually but full details are provided in Appendix 8. The full questionnaire completed by both mothers and fathers in this study, including all aspects of the measures reported below, is provided in Appendix 9. The questionnaire was completed individually and provided demographic details about each parent, including: age, educational level, and occupation.

Subjectively reported parent and child sleep

Child sleep behaviour - *Brief Infant Sleep Questionnaire (BISQ)* (Sadeh, 2004).

The BISQ has been reported in full in section 3.2.2 of study one. This is a 10-item questionnaire in which parents report child sleep behaviour, including the amount of time the child spends asleep overnight and during the day, as well as the average amount of time taken to settle the child, and the number of night-wakings. Parental perceptions of whether or not they consider their child to

have a CSP are also indicated. In this study, eight items of the original BISQ were used. Items regarding the child's sleeping arrangements and most common sleep position were omitted due to being addressed in the background child details interview. However, these items are used for purely descriptive purposes and do not impact upon BISQ scoring. In this study, as in study one and as has been used in previous studies, three individual items were used to produce a simple clinical cut-off-score to determine poor sleepers. These three items cover different aspects of child sleep and are: the child wakes >3 times per night; nocturnal wakefulness is >1 hour; total sleep time is <9 hours. Based on these criteria, children were split into groups of good sleepers (exhibiting none of these criteria) or poor sleepers (exhibiting one or more of the criteria). In the current study, this cut-off-score was used as a *research definition* of poor sleep. In addition, a *parent definition* of poor sleep was also used. This was defined by parents' answers to the question 'Do you consider your child's sleep as a problem?' Parents could select one of three options: 'a very serious problem', 'a small problem' or 'not a problem at all'. For some analyses where a binary variable was required, those answering 'not a problem at all' were considered to have a child with parentally defined good sleep and those answering 'a very serious problem' or 'a small problem' were combined to represent children who had a parentally reported CSP of some degree. This parental perception variable (with two response options; 'yes' or 'no') is used as a main categorising variable in data analysis.

Child settling and night-waking sleep problems - *Composite Sleep Disturbance Index (CSDI) (*Richman & Graham, 1971).

This 7-item parentally reported, reliable, and valid questionnaire screens for the severity of CSPs (Richman & Graham, 1971). Parents report on the frequency and duration of child sleep problems, specifically settling and night-waking problems. The CSDI has been widely used for assessing the severity of settling and night-waking problems in paediatric sleep research with children who suffer from developmental disorders (Gringas et al., 2014; Montgomery, Stores, & Wiggs, 2004). The CSDI has been shown to be sensitive to change (Quine, 1992), and demonstrated high internal reliability (Quine, 1991). CSDI scores are calculated by assessing the weekly frequency and duration of settling and night-waking issues, while items pertaining to early waking and co-sleeping are

scored on frequency only (Wiggs & Stores, 1998). The specific items used in previous studies have varied somewhat depending on the research interests of individual studies. In the current study, four frequency-based items were used which covered settling, night and early morning waking, and co-sleeping. These items were scored: <1 per week = 0; 1-2 times a week = 1; >3 times a week = 2. Also included were two duration-based items that covered time taken settling and re-settling overnight and were scored: few minutes = 0; <30 minutes = 1; >31 minutes = 2. Each item had a possible score of 0-2, so with six items in total, overall scores ranged from 0-12. Higher CSDI scores indicate more severe CSPs.

Parental sleep quality - *Pittsburgh Sleep Quality Index (PSQI) (*Buysse, Reynolds, Monk, Berman, & Kupfer, 1989).

This 24-item questionnaire is designed to assess self-reported sleep quality in adults. The PSQI has seven subscales: subjective sleep quality; sleep latency; sleep duration; habitual sleep efficiency; sleep disturbances; use of sleeping medication; and daytime dysfunction. The original questionnaire also features a section completed by participants' bed partners, however it was omitted in the current study as the section is not included in scoring and was not deemed relevant to the current study. The PSQI has been extensively used and is widely regarded as a reliable and clinically meaningful measure of subjective adult sleep quality. Participants respond using Likert scales and open-ended responses to report details of their sleep behaviour over the last month, including: sleep-wake times; frequency of certain sleep behaviours and disturbances; and rating of sleep quality. The seven components each yield a score ranging from 0, which indicates no difficulty, to 3, which indicates severe difficulty. A global score can be generated by summing the subscales with a total score of 0-21, whereby high scores indicate severe difficulties in all areas. A cut-off threshold successfully distinguishes between 'good' and 'poor' sleepers, with scores >5 representing poor sleepers (Buysse et al., 1989).

Parental sleep practices

Parental practices relating to their own sleep *– The Sleep Practices and Attitudes Questionnaire* (Grandner, Jackson, Gooneratne, & Patel, 2014).
As the SPAQ was used in the current study to assess both sleep practices and sleep knowledge in relation to both the parent themselves and child sleep, where it was used to assess parental practices relating to their own sleep, the letter A (referring to adult) and P (referring to practices) were added for clarity and to help differentiate this use of the SPAQ from the other forms and adaptations used in this study. When referring to parental practices relating to their own sleep, the acronym SPAQ-A-P will be used hereon in.

The original SPAQ has been explained in detail in section 3.2.2. In this study 5 of the original 16 subscales, those to do with actual sleep practices (the subscales of coping with sleepiness; coping with acute insomnia; coping with chronic insomnia; activities in bed; and sleep environment) were included to represent actual parental sleep-related practices. This resulted in 31 items being included (see Appendix 11 for full details of the SPAQ-A-P items).

As reported in study one, the SPAQ questionnaires were also used in two distinct ways in the current study. Firstly, in line with original design, items were presented descriptively to allow individual items to be interpreted. This provided an illustration of parents' sleep-related practices by indicating how strongly parents endorsed a range of statements about different practices which could be used in relation to one's own sleep in a range of different circumstances (e.g., if experiencing daytime sleepiness or having trouble sleeping). In the current study, as described in section 3.2.2, all items were presented and for practical reasons, the original 5-point Likert scale response option was collapsed to a simplified 3-point Likert response scale, where participants' responses to statements represented disagree to any extent, unsure, or agree to any extent.

Secondly, SPAQ responses were scored to provide an overall indication of whether individuals endorsed overall positive or poor sleep-related practices. The SPAQ-A-P provides an indication of individual sleep-related practices, of both a positive nature (i.e., those known to be conducive to sleep) and of a

negative nature (i.e., those known to be disruptive to sleep). In consultation with a behavioural sleep expert, items were examined and then classified as representing positive or negative sleep-related behaviours, resulting in 28 items (14 positive and 14 negative) from the original SPAQ-A-P being included. Any item not directly relevant to an individual's actual practices or that could have been misinterpreted were omitted (see Appendix 11 for classification of items). Parents' level of agreement with items were scored based on the original 5-point Likert scale responses, therefore strongly agreeing with a positive item generated a score of 0 and strongly disagreeing with a positive item generated a score of 4. Strongly agreeing with a negative item generated a score of 4 and strongly disagreeing with a negative item generated a score of 0. All 28 scored items (only those that were scored as unambiguously positive or negative) were then summed to produce an overall SPAQ-A-P score for each parent. Higher scores indicated poorer sleep-related practices, while lower scores indicated more positive sleep-related practices.

Parental practices relating to their child's sleep (SPAQ-C-P) - Adapted from the *Sleep Practices and Attitudes Questionnaire* (Grander et al., 2014).
As the SPAQ was also used here to assess parental practices relating to their child's sleep, the letter C (referring to child) and P (referring to practices) were added for clarity. When referring to parental practices relating to their child's sleep, the acronym SPAQ-C-P will be used hereon in.

A number of measures have been developed which assess the settling and soothing behaviours parents employ in relation to their child's sleep. While such measures were utilised in this study (see below), no measure currently allows assessment of parental sleep-related practices outside the settling and soothing strategies employed. Therefore, a measure of parental practices in relation to child sleep was developed, specifically for the purposes of this study, by adapting the SPAQ-A-P. This allowed comparison between parents' own sleep practices and those they employed with their child.

Statements were adapted from those about adult sleep to reflect how parents may think or behave in relation to various aspects of their child's sleep. As an example, in the original SPAQ, adults were asked if they were having trouble

sleeping tonight how strongly they agreed with the statement that they would 'do something in bed (like read or watch TV)'. This item was adapted so that parents were asked if their child was having trouble sleeping tonight how strongly they agreed with the statement that they would 'give them something to do in bed (like toys or books)'. Some items in the SPAQ-A-P were not relevant to child sleep or parental practices in relation to child sleep, and so were removed. These items pertained to issues such as increasing or decreasing caffeine, drinking alcohol, smoking, worrying, feeling angry, or arguing. This resulted in 24 (of the original 31 SPAQ-A-P) items being included. See Appendix 12 for full breakdown of adapted item SPAQ-C-P wording.

This questionnaire was adapted in consultation with experts in familial, child, and sleep research. Parents rated how strongly they agreed or disagreed with each statement on a 5-point Likert scale ranging from strongly disagree to strongly agree. As with SPAQ-A-P, response options were collapsed to a 3-point Likert scale for descriptive data presentation. Further, individual items were also coded and scored using the same method as was reported for the SPAQ-A-P, to produce an overall score for parental sleep-related practices in relation to child sleep. For the SPAQ-C-P, this resulted in 20 items (only those that were scored as unambiguously positive or negative) being included when the questionnaire was coded and scored (13 positive and 7 negative). See Appendix 12 for classification of SPAQ-C-P items. Higher scores on SPAQ-C-P indicated poorer parental sleep-related practices in relation to their child's sleep, while a lower score indicated more positive sleep practices with their child.

Parental bedtime behaviours with child *- Parental Interactive Bedtime Behaviour Scale (PIBBS) (*Morrell & Cortina-Borja, 2002).
This 19-item parentally reported questionnaire assesses the strategies parents use when settling and soothing their child to sleep and how often each strategy is employed. The PIBBS has satisfactory internal consistency (Morrell, & Cortina-Borja, 2002). Respondents rate on a 5-point Likert scale how often they employ each behaviour ranging from never (0) to very often (4). Parents report solely on behaviours they use to settle their child to sleep. In this study, an additional item was added, as a result of piloting and professional feedback, to represent parents who do not employ any specific methods but 'put child in their

own bed / cot and leave them to settle themselves'. The item was added at the end of the questionnaire and used the same response scale as original items.

Five factors have been identified and the range of the scores relevant to each factor are as follows: active physical comforting (0-24); encourage autonomy (0-12); settle by movement (0-8); passive physical (0-8); and social comforting (0–12). Higher scores for each method represent more endorsement of that 'type' of settling strategy. It is also possible to calculate a total percentage score (physical comforting–encourage autonomy+settle by movement+passive physical+social comforting+100)/5. In the current study, the encourage autonomy factor and total percentage scores were calculated both with and without the additional item to explore whether including the item had an impact on scores.

Parental knowledge about sleep

Parental knowledge and understanding about adult sleep (SPAQ-A-K) - Adapted from the *Sleep Practices and Attitudes Questionnaire* (Grander et al., 2014). As the SPAQ was used here to assess parental knowledge about adult sleep, the letter A (referring to adult) and K (referring to knowledge) were added for clarity. When referring to parental knowledge relating to adult sleep the acronym SPAQ-A-K will be used hereon in.

To assess parental knowledge and understanding about sleep in general the SPAQ subscales: sleep knowledge; importance of sleep; effects of external factors on sleep; and effects of sleep on daytime functioning were included, with minor adaptation. In the original SPAQ, items related to the importance of sleep for different age groups were worded such as, 'How important is getting healthy sleep for adults?' and used a response scale ranging from 'very important' to 'not important'. To amalgamate these items into the same responses scale as other items, these items were re-phrased in such a way to allow them to be answered according to how strongly participants agreed with these statements (e.g., 'getting healthy sleep is important for adults'). One additional item from the original SPAQ (Grander et al., 2014) was added due to its perceived relevance to parents' knowledge about the importance of sleep to healthy functioning. This item was, 'My sleep is important to my health' (part of original subscale sleep and health). This produced a final questionnaire of 29 items.

The questionnaire was designed for individual items to be descriptively interpreted. As previously described, SPAQ subscales were rated by parents on a 5-point Likert scale according to how strongly participants agreed or disagreed with each statement, ranging from 'strongly disagree' to 'strongly agree'. Response options were collapsed to a 3-point Likert scale for data presentation.

The SPAQ-A-K was also coded and scored to provide an overall indication of an individual's knowledge and understanding about adult sleep. As with the previously described SPAQ-A-P, these items were examined in consultation with a behavioural sleep expert and classified as representing positive or negative sleep-related knowledge or understanding, resulting in 13 items (of the original 29 items) being included: 8 positive and 5 negative items from the original SPAQ-A-K (see Appendix 13 for classification of items). The questionnaire was coded and scored using the same method as was used for the adult SPAQ-A-P, to produce an overall score where higher scores indicated poorer parental knowledge about adult sleep, while lower scores indicated more sleep-related knowledge.

Parental knowledge and understanding about child sleep (SPAQ-C-K) - Adapted from The *Sleep Practices and Attitudes Questionnaire* (Grander et al., 2014). As the SPAQ was used here to assess parental knowledge about child sleep, the letter C (referring to child) and K (referring to knowledge) were added for clarity. When referring to parental knowledge relating to child sleep the acronym SPAQ-C-K will be used hereon in.

To assess parental knowledge and understanding about child sleep, the same four SPAQ domains as described above (sleep knowledge; importance of sleep; impact of external factors on sleep; and impact of sleep on daytime functioning) were adapted to represent statements about child sleep. For example, 'My work affects when and how much I sleep' was adapted to 'My child's day affects how much they sleep'. Some items were excluded due to being inappropriate or unnecessary to child sleep; items relating to driving, commuting, feeling unsafe at night, stress or worry impacting sleep, and importance of sleep for adults or seniors were removed. See Appendix 2 for

details of items and adapted wordings. Items were adapted maintaining the integrity of the question topic and/or nature of the original statements. Any changes made were to ensure items were relevant for parents to answer based on child sleep. This questionnaire was developed with input and guidance from experts in children and families research, as well as child sleep research experts. Twenty-one items were included. Individual items were designed to be descriptively interpreted. As in the original questionnaire, parents rated items on a 5-point Likert scale according to how strongly they agreed or disagreed with each statement. Response options were collapsed to a 3-point Likert scale for data presentation.

As with the SPAQ-A-P questionnaire, these items were examined in consultation with a behavioural sleep expert and classified as representing positive or negative sleep-related knowledge or understanding, resulting in 10 items from the original SPAQ-A-K (21 items) being included (7 positive and 3 negative). The questionnaire was coded and scored using the same method as was used for the adult SPAQ-A-P to produce an overall score where higher scores indicated poorer parental knowledge about child sleep, while lower scores suggested more sleep-related knowledge about child sleep. See Appendix 2 for classification of SPAQ-C-K items.

Parental Cognitions

Parental dysfunctional cognitions about their own sleep - *Dysfunctional Beliefs and Attitudes about Sleep questionnaire* (DBAS) (Morin, Vallieres, & Ivers, 2007)

This 16-item questionnaire assesses parental cognitions about their own sleep. This is a shortened version of the original DBAS (Morin et al., 1993), a 30-item questionnaire developed to assess dysfunctional or sleep-disruptive cognitions about sleep. The DBAS-16 assesses sleep-related cognitions across: perceived consequences of insomnia; worry or helplessness about insomnia; sleep expectations; and medication. The DBAS-16 has good temporal stability and correlates with other self-report measures of insomnia, anxiety, and depression (Morin et al., 2007). Although there are no categorically right or wrong answers, responses are quantified according to the strength of the endorsement of specific beliefs. Participants rate how strongly they agree or disagree with each item on a 10-point Likert-type scale ranging from 1 (strongly disagree) to 10

(strongly agree). A total DBAS score can be calculated and was used in the current study by summing scores for each item and then dividing them by 16 to produce a total average score. Higher DBAS scores represented increased endorsement of dysfunctional beliefs.

Parental cognitions about child sleep *- Parental Cognitions about Infant Sleep Questionnaire* (PCISQ) (Sadeh et al., 2007)

This 20-item questionnaire assesses parental cognitions about their child's sleep. The PCISQ was adapted from the Maternal Cognitions about Infant Sleep Questionnaire (MCISQ; Morrell, 1999), with wording changed to refer to 'parents' rather than solely 'mothers'. This allows maternal and paternal cognitions about child sleep to be investigated. The MCISQ has been found to demonstrate good psychometric properties, and has also been demonstrated to be sensitive to distinguishing between mothers of children with and without sleep problems. The internal consistency is reported to range from .80 and .84 and test–retest correlation for total score is .81 (Morrell, 1999).

Five subscales make up the questionnaire: *limit setting,* which reflects parental difficulties in setting limits on their child's behaviour or resisting their child's demands; *anger,* which reflects negative feeling towards the child; *doubt,* which reflects feelings of doubt about parental competency; *feeding,* which reflects concerns about overnight feeding issues; and *safety,* which reflects parental concerns about child's overnight safety. Each item is rated on a 6-point Likert-scale ranging from strongly disagree (0) to strongly agree (5). Items 6, 11, 16, and 19 are reverse scored. Individual subscales and a total questionnaire score (derived by summing all subscales) can be calculated and both were used in the current study. Higher scores represent increased concerns and doubts across all of the subscales and the total score. The original measure was developed based on a sample of 13-16 month old infants. However, in the current study the feeding subscale (items 2, 5, 20) was omitted, as was not appropriate for the older age range used. This meant the final PCISQ questionnaire used in this study was made of 17 items with a total score of 0-85.

Parental competence - *Parenting Sense of Competence Scale* (PSOC) (Johnston & Mash, 1989).

This 17-item questionnaire measures parental perception of their competence of being a parent. Factor analysis suggests that the PSOC assesses two aspects: *parenting satisfaction,* which assesses parental anxiety, motivation and frustration in relation to parenting their child, and *parenting efficacy*, which assess parental competence, capability, and problem solving in their parenting (Johnston & Mash, 1989). A total score of overall parenting competence can also be calculated. Item 17 does not satisfactorily load onto either factor and so is commonly omitted, including in this study. The factor structure and validity has been replicated with both mothers and fathers, albeit only with small sample sizes (Ohan, Leung, & Johnston, 2000). Items are rated on a 6-point Likert scale ranging from strongly agree (1) to strongly disagree (6). Higher scores indicate greater parenting sense of competence. Items 1, 6, 7, 10, 11, 13, and 15 are reverse scored. In this study the satisfaction factor (items 2, 3, 4, 5, 8, 9, 12, 14 and 16) and efficacy factor (items; 1, 6, 7, 10, 11, 13 and 15) were calculated for mothers and fathers, as well as a total PSOC score for each, based on 16 items with a potential scores of 16-96.

Parental mental health - *General Health Questionnaire-12* (GHQ) (Goldberg & Williams, 1988; Goldberg, 1972)

This is a shortened version of the original GHQ, which was designed as a screening tool to identify minor non-psychotic psychiatric disorders in the general population (Goldberg & Williams, 1988). The GHQ-12 has comparable psychometric properties to the longer questionnaires (Golderberg et al., 1997). Participants rate their agreement with 12 statements on a 4-point scale with responses ranging from 'better or healthier than normal', 'same as usual', 'worse or more than usual', and 'much worse or much more than usual'. Exact response wording differs depending on the specific statements. The GHQ-12 was scored using a validated 4-point Likert scoring system where scores 0-1-2-3 are applied. A total score can be calculated with a range 0-36 whereby higher scores represent poorer mental health (Lundin, Hallgren, Theobald, Hellgren, & Torgen, 2016). Thresholds were applied to divide responses into healthy (<16), worse than usual (16-32), and severe/poor (>32).

Child temperament - *Child Characteristics Questionnaire (CCQ). (*Bates, Freeland, & Lounsbury, 1979).

This is a parentally reported 32-item questionnaire that assesses parental perceptions of child difficultness. The 24-month form, used is this study, is comprised of seven factors: difficultness; negative adaptation to change; unstoppable; dependent; irregular; sober; and an unclassified factor. The 6-month-old form has been the most extensively evaluated and exhibits an adequate factor structure, internal consistency, and test-retest validity (Bates et al., 1979). Evidence suggests the 24-month form has similar characteristics (Lee & Bates, 1985). Each item is rated on a 7-point Likert scale where a score of 1 represents a child with optimal behaviour or an easy temperament, 4 being 'about average', and 7 representative of a child with a difficult temperament. Subscale scores can be calculated by summing relevant items, and a total questionnaire score can also be calculated by summing all items, with a potential range from 32-224. A total questionnaire score of 32 is representative of a parental perception of an easy child temperament, a score of 128 represents a child of average temperament, and a score of 224 represents a difficult temperament. In this study, the difficult subscale (range of possible scores 7-49) and total questionnaire score were used to provide an indication of parental perception of difficultness of child temperament, split into easy, average, and difficult based on the cut-offs provided.

6.2.3. Procedure

The study was approved by the Oxford Brookes University Research Ethics committee (study number 150932, see Appendix 5 for UREC approval letter). The study was piloted in full on two families (mother, father, and toddler). A small number of minor language adaptations were made based on pilot feedback, predominantly to improve clarity for parents. Full details of adaptations made are provided in Appendix 14. A total of 44 families (two with twins who both participated) were recruited, and participated between April 2016 and November 2016. Participants who expressed an interest in taking part were supplied with the participant information sheet. Parents who remained interested in participating after reviewing this document were scheduled an initial conversation with the researcher to answer any questions and confirm eligibility. Participating families (in some cases one parent in other cases both

parents and/or their child) were met at their home or an alternative convenient location. At this meeting, parents provided full informed consent and completed a brief child and parental background interview with the researcher. Guidance was delivered at this meeting regarding how to use actigraphs and complete the sleep diaries. Parents were provided with packs that included two hard copies of the questionnaire to be completed independently by mothers and fathers, instructions on how to use the actigraphs, and copies of the primary night-time caregiver (PNCG) and child sleep diaries. An email was sent to parents at this point, providing a link to an online version of the questionnaire to allow parents to complete a paper or electronic copy, dependant on their preference. PNCGs were asked to gather actigraphy data on their own and their child's sleep for 5 nights alongside concurrent completion of sleep diaries. Actigraphs were placed on the child's ankle in the first instance. If this was an issue, parents were advised the actigraph could alternatively be placed on the child's wrist. During the week in which actigraphy data was collected parents completed the questionnaires, reflecting on the 'last few typical weeks'. The researcher returned around a week later for a brief meeting with families to collect actigraphs, sleep diaries, and where appropriate, completed questionnaires. After data were collected, participating parents received a £10 amazon voucher and, if desired, a summary of their child's actigraphy data.

6.2.4. Data handling and statistical analysis

Dealing with data from families with twins

Where families with twins participated, both parents completed a full questionnaire for one child and completed a separate questionnaire of the child specific variables only (BISQ, CSDI, SPAQ-C knowledge, SPAQ-C practices, PCISQ, PIBBS, and CCQ) for the other child; to ensure both children could be included in the analysis while reflecting their individual data. All other non-child specific parental variables (e.g., parental demographics, GHQ, PSQI, SPAQ-A practices, SPAQ-A knowledge, DBAS, and PSOC) for the parents were duplicated for analysis purposes.

Parental agreement scores (calculating congruence or discordance)

Parental congruence and discordance scores were calculated for parental cognitions (DBAS-16 and PCISQ), sleep practices (SPAQ-A-P and SPAQ-C-P),

and methods used to settle their child (PIBBS). Original response options were reduced to represent logical groups. For example, the DBAS scoring was split so that raw item scores of 1-5 represented disagreeing to some extent with the statement whereas scores of 6-10 represented agreeing to some extent with the statement. The same approach was applied to PCISQ. For SPAQ-P questionnaires (parent and child), a collapsed 3-point Likert response was used (1= disagree to some extent, 2=unsure and 3=agree to some extent). Finally, the PIBBS was reduced to 3 categories (1=never/rarely, 2=sometimes, and 3=often/very often).

To generate an indication of congruence or discordance between parents, a mean percentage level of parental agreement for each scale was calculated. Firstly, parental responses were compared on an item-by-item basis. If parents responded in the same manner for an item they were deemed to be congruent in their agreement and for each such item where this was the case, they received a score of 1. For each item where parent's responses did not match, they were considered discordant and 'scored' as 0. Once each item had been 'scored', these were summed to produce an overall figure of congruence for each parental dyad across each measure (e.g., number of items for which parents were congruent), with higher scores representing more parental agreement. Overall level of parental agreement (as a percentage of the total possible score) for each relevant scale was calculated for data presentation. Higher percentage scores represented a higher level of parental agreement for each scale.

Child Sleep

Two distinct methods were employed in the study to subjectively categorise child sleep as problematic: parental perception (BISQ item) of a CSP, and whether child sleep met the research definition of a CSP (calculated from 3 BISQ items). When one parental report variable of child sleep was required for analysis purposes, the BISQ parental perception item was used. This was due to the fact that this allows parents to base their judgement of their child's sleep across a range of aspects. When a more general account of child sleep was required, the research definition was applied as this was based on frequency and duration of aspects of child sleep behaviour.

For the objective measure of child sleep, when a single outcome variable was required for analysis, the actigraphic sleep efficiency variable was used. This was chosen because the percentage of time in bed spent asleep is a ratio variable and therefore not affected by developmental changes or individual differences in sleep requirements and sleep timing. Further, it is a widely used index of overall sleep quality (Meltzer, Montgomery-Downs, Insana, & Walsh, 2012; Sadeh, Flint-Ofir, Tirosh, & Tikotzky, 2007).

Missing data

Data was initially explored descriptively. Small amounts of missing data were identified at this point and were addressed in the following ways. Firstly, where items were presented purely descriptively, missing data was not altered. Secondly, when missing data items prevented the calculation of a subscale, total, or parental agreement score, missing items were pro-rated for these calculations, where at least 70% of the data were available. See Appendix 15 for an overview of the procedure applied.

Exploration of the data

This study sought to explore (i) maternal and paternal beliefs and practices about their own and their child's sleep; (ii) if there were associations between these parental variables and the child's sleep; and (iii) if there were any differences in these variables between mothers and fathers. Therefore, the data was explored in a variety of different ways. Where appropriate, descriptively presented data, is presented by individual item and overall subscale or total scores. Associations between variables were explored through investigation of the correlational relationships between variables. Regressions were used to explore the predictive nature of relationships between key variables. These included parental cognitions (about parental own and child sleep), knowledge (about own and child sleep), sleep-related practices (parental own and child sleep), and level of parental agreement across these variables and child sleep.

Finally, differences between mothers and fathers across a range of different variables were explored using independent t-tests and, where necessary,

Mann-Whitney tests. A significance value of P<.05 was applied throughout, and exact significance value is presented when appropriate.

Assumption checking for statistical tests

Associations between variables

When correlations were run to explore associations between variables, prior to any statistical tests being performed, variables were checked for normal distribution. Where data met assumptions for parametric tests, Pearson correlation tests were run and are reported. In the cases where data did not meet parametric assumptions, Spearman's Rho correlation tests were run and are clearly denoted in the results section.

Differences between groups (mothers v fathers, CSP v no CSP)

Where differences between groups were explored, prior to any statistical tests being performed, variables were checked for normal distribution and homogeneity of variance. Where data met assumptions for parametric tests, independent t-tests were run and are reported in the results section denoted by a t value. If Levene's test stated that equality of variances had been violated in any independent t-test, equal variances were not assumed and appropriate statistical results are reported. In the cases where data did not meet parametric assumptions, Mann Whitney-U tests were run and are reported in the results section denoted by a U value.

Predictive nature of variables

Regression models were used to explore the predictive relationships between key variables of interest in the study. Prior to all linear regression analyses being performed, predictor variables were checked for multicolinearity, no correlation greater than 0.8 was found for any variables. Examination of histograms and normality tests indicated all residuals were normally distributed. Therefore, it was deemed appropriate to perform linear regressions in all cases where they have been conducted. Where the outcome variable of interest was categorical, binary regressions were used and are reported.

Corrections for multiple testing

The overall purpose of study two was to be exploratory and investigate the possible influence of a large number of variables on each other (as both predictor and outcome measures) and ultimately on CSPs with a view to highlighting areas of interest for future studies and, as such, adjustments for multiple comparisons were not made to multiple regression analyses. However, it is important to note that this approach has the potential to inflate type 1 errors. Where multiple correlational analyses were performed using the same variables results are therefore reported both with and without Bonferroni corrections. These corrections are acknowledged to be conservative but by presenting these data attention is drawn to robust findings.

The specific variables and statistical tests run in each case will be clearly detailed, as is appropriate, throughout the results section in chapter 7.

Chapter 7

Study two: Results

This chapter will begin by presenting descriptive details of the sample. Firstly, the parent variables (including congruence within the dyads) and secondly, the child variables will be presented. Where appropriate, throughout the presentation of these descriptive data any differences between mothers and fathers will be commented upon. Next, the results of statistical analyses conducted on the data to address the research questions, will be presented.

7.1. Parental variables – descriptive statistics

7.1.1. Parental self-reported sleep

Parents reported on various aspects regarding their own sleep. An overview of key subjective aspects of parental sleep (as assessed by the PSQI) is shown in Table 25. When the PSQI global score cut-off (>5) were applied, 31 (67.4%) mothers and 29 (63.0%) fathers were classified as good sleepers. There was no significant difference between maternal and paternal sleep quality (as assessed by PSQI total score), U=950.5, N=92, *p*=.396.

Table 25. Parentally reported Pittsburgh Sleep Quality Index (PSQI) variables

	Mothers (n=46)			Fathers (n=46)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Bedtime	10.52 (.69)	9.5	12.5	10.92 (.78)	9.5	12.5
Sleep onset latency (mins)	.22 (.17)	.01	1	.25 (.26)	0	1.5
Get up time	6.63 (.65)	5.5	9.5	6.69 (.60)	5.5	8.5
Sleep per night (hours)	7.14 (.81)	5.5	9.5	7.02 (.82)	5	8.5
Global PSQI score (max 21)	4.59 (2.55)	0	11	4.90 (2.20)	1	10

7.1.2. Parental objectively measured sleep

Data from 43 parents (35 mothers and 8 fathers) were included in primary night-time caregiver (PNCG) actigraphy analysis. Three families (child and parent) were omitted due to poor raw actigraphy data and/or regular co-sleeping. A mean number of 5.02 (*SD*=.60) nights data was obtained (minimum of 3 to maximum of 7 nights actigraphy data collected from each individual family), an overview of actigraphy variables are displayed in Table 26.

In addition to descriptively presenting raw data to provide an overview of objectively assessed PNCG sleep, difference tests were used to explore if there were any differences between the objectively assessed sleep of PNCGs who perceived their child to have a child sleeplessness problem (CSP) and those who did not (as assessed by parental perception item). There were no significant differences between the objective sleep of PNCGs who did and those who did not consider their child to have a CSP, with one exception; see Table 26. Duration of sleep minutes between PNCGs who did consider their child to have a CSP (*Mdn*=388.5, *IQR*=62.95) and those who did not consider their child to have a CSP (*Mdn*=441.0, *IQR*=56.30) differed significantly, U=95, N=43, *p*=.044. This suggests that parents who considered their child to have a CSP obtained significantly less sleep minutes per night than parents who did not consider their child to have a CSP.

Table 26. Primary night-time caregiver decimalised actigraphy variables

Actigraphy variable	Mean (SD) whole sample (n=43)	Min	Max	Mean (SD) PNCG CSP Yes (n=10)	Mean (SD) PNCG CSP No (n=33)	Difference tests*
Bedtime	10.97 (.60)	9.81	12.75	11.11 (.57)	10.93 (.61)	t(41)=.83, *p*=.409
Sleep start time	11.16 (.58)	10.03	12.93	11.31 (.51)	11.12 (.60)	t(17.17)=.98, *p*=.342
Sleep onset latency	10.78 (10.44)	.80	58.33	11.31 (7.82)	10.62 (11.21)	U=141.5, N=43, *p*=.499
Wake-up time	6.76 (7.05)	5.56	9.29	6.78 (.48)	6.75 (.77)	U=141, N=43, *p*=.490
Get up time	6.96 (.68)	5.88	9.31	7.10 (.42)	6.91 (.75)	U=116.5, N=43, *p*=.163
Sleep efficiency	87.58 (8.81)	59.10	98.13	83.20 (8.63)	88.90 (8.55)	U=97, N=43, *p*=.051
Activity (mean)	13.43 (6.27)	4.77	33.60	14.79 (6.75)	13.02 (6.17)	U=128, N=43, *p*=.287
Sleep minutes	420.24 (52.99)	280	510.33	397.98 (40.65)	426.99 (54.95)	**U=95, N=43, *p*=.044**
Wake after sleep onset	36.37 (30.92)	1.40	145.20	51.37 (38.09)	31.82 (27.48)	U=106, N=43, *p*=.090
Sleep fragmentation index	.54 (.40)	.04	1.64	.72 (.39)	.49 (.39)	U=103.5, N=43, *p*=.077

*Group difference tests of objectively measured PNCG sleep variables (determined by actigraphy) between PNCG who did and did not consider their child to have a CSP (BISQ item)

7.1.3. Parental functioning and parenting competence

Parental functioning (as assessed by GHQ) was generally good, around 90% of mothers (41, 89.1%) and fathers (42, 91.3%) responses classified them as healthy. There were 5 mothers (10.9%) and 4 fathers (8.7%) whose responses classified them as worse than usual, but no parent's mental health was classified as severe/poor.

Parenting competence (as assessed by PSOC) results are displayed in Table 27. Higher scores suggest greater parenting efficacy, satisfaction, or overall perceived parenting competence.

Table 27. Parenting sense of competence (PSOC) subscale and total scores

		Mothers (n=46)			Fathers (n=45)		
	Possible range	Mean (SD)	Minimum score	Maximum score	Mean (SD)	Minimum score	Maximum score
Satisfaction	9-54	38.26 (5.13)	26	47	36.51 (7.10)	21	53
Efficacy	7-42	29.89 (4.72)	22	42	27.44 (5.34)	10	38
Total score	16-96	68.15 (7.66)	55	86	63.96 (11.14)	31	91

No significant difference was found between mothers and fathers for PSOC satisfaction scores, t(89)=1.35, *p*=.180, however, PSOC efficacy scores were significantly higher for mothers (*M*=29.89, *SD*=4.72) than fathers (*M*=27.44, *SD*=5.34), t(89)=2.32, *p*=.023. This suggests that mothers experienced significantly higher levels of parenting efficacy than fathers. Similarly, PSOC total scores were significantly higher for mothers (*M*=68.15, *SD*=7.66) than for fathers (*M*=63.96, *SD*=11.14), t(77.87)=2.09, *p*=.040, this suggests that mothers experienced significantly higher feelings of parenting competence than fathers.

7.1.4. Parental cognitions, knowledge, and practices relating to their own sleep

Maternal and paternal responses to the DBAS which provides an indication of parental cognitions about their own sleep, SPAQ-P-K which provides an indication of level of knowledge concerning their own adult sleep and SPAQ-A-P which provides an indication of their sleep-related practices are shown in Table 28. Higher scores indicate increased levels of dysfunctional cognitions,

poorer knowledge about adult sleep, and the increased use of negative sleep-related practices respectively.

Table 28. Comparison of maternal and paternal cognitions, sleep-related practices, and knowledge relating to their own sleep

		Mothers (n=46)			Fathers (n=46)		
	Possible range	Mean (SD)	Min	Max	Mean (SD)	Min	Max
DBAS	1-10	4.44 (1.14)	1.75	6.38	4.19 (1.28)	1.56	6.50
SPAQ-A-K*	13-65	26.28 (4.53)	17	36	26.09 (3.55)	19	32
SPAQ-A-P	28-140	62.20 (8.54)	43	83	65.35 (7.15)	49	83

*45 paternal responses

There was no significant difference between maternal and paternal cognitions about their own sleep (DBAS), t(90)=0.98, *p*=.328; knowledge (SPAQ-A-K) about adult sleep, t(89)=0.23, *p*=.821; or sleep-related practices (SPAQ-A-P) relating to their own sleep, t(90)=1.92, *p*=.058.

The SPAQ questionnaires were designed to be interpreted descriptively, to allow these results to be compared with other samples item-by-item maternal and paternal responses to the SPAQ-A-K and the SPAQ-A-P are presented in Tables 29 and 30 respectively.

Table 29. Maternal and paternal responses to SPAQ-A-K

	Mothers (n=46)			Fathers (n=46)		
	Disagree to some extent	Unsure	Agree to some extent	Disagree to some extent	Unsure	Agree to some extent
My work affects when and how much I sleep	14 (30.4)	3 (6.5)	29 (63.0)	15 (32.6)	5 (10.9)	25 (54.3)*
Home responsibilities affect when and how much I sleep	7 (15.2	0	39 (84.8)	8 (17.4)	3 (6.5)	34 (73.9) *
My commute affects when and how much I sleep	30 (65.2)	1 (2.2)	15 (32.6)	28 (60.9)	3 (6.5)	14 (30.4) *
Sometimes when I am feeling down or depressed, it affects my sleep	21 (45.7)	3 (6.5)	22 (47.8)	18 (39.1)	6 (13.0)	21 (45.7)*
Sometimes my sleep is affected because I feel unsafe at night	45 (97.8)	0	1 (2.2)	43 (93.5)	2 (4.3)	0*
I care about making sure that I have enough time to sleep	2 (4.3)	5 (10.9)	39 (84.8)	5 (10.9)	12 (26.1)	28 (60.9)*
Getting enough sleep is important for me to be able to enjoy the day	2 (4.3)	1 (2.2)	43 (93.5)	9 (19.6)	5 (10.9)	31 (67.4)*
Going to bed at a good time is important to me	3 (6.5)	3 (6.5)	40 (87.0)	9 (19.6)	7 (15.2)	29 (63.0)*
My sleep is important to my health	2 (4.3)	1 (2.2)	43 (93.5)	1 (2.2)	4 (8.7)	40 (87.0)*
My sleep is affected by stress and/or worrying	12 (26.1)	7 (15.2)	27 (58.7)	13 (28.3)	3 (6.5)	29 (63.0)*
Not enough sleep can lead to serious consequences	1 (2.2)	10 (21.7)	35 (76.1)	0	6 (13.0)	39 (84.8)*
Poor sleep affects the quality of my life	8 (17.4)	2 (4.3)	36 (78.3)	2 (4.3)	3 (6.5)	40 (87.0)*
Dozing while driving a vehicle is serious	0	0	46 (100)	0	0	45 (97.8)*
My doctor has discussed the importance of a regular sleep schedule	38 (82.6)	4 (8.7)	4 (8.7)	35 (76.1)	4 (8.7)	6 (13.0)*
My doctor has discussed the importance of getting enough sleep	38 (82.6)	3 (6.5)	5 (10.9)	33 (71.7)	2 (4.3)	10 (21.7)*
If you are really bored, you might fall asleep, even if you slept well the night before	23 (50)	9 (19.6)	14 (30.4)	25 (54.3)	10 (21.7)	10 (21.7)*
Lying in bed with your eyes shut is as good as sleeping	35 (76.1)	6 (13)	5 (10.9)	39 (84.8)	3 (6.5)	3 (6.5)*
I can tell when I am sleepy	0	0	46 (100)	1 (2.2)	2 (4.3)	42 (91.3)*
Opening the car window is a good way to wake me up if I am drowsy while driving	11 (23.9)	9 (19.6)	26 (56.5)	9 (19.6)	18 (39.1)	18 (39.1)*
Turning up the volume of the radio or music is a good way to wake me up if I am drowsy while driving	19 (41.3)	11 (23.9)	16 (34.8)	17 (37.0)	14 (30.4)	14 (30.4)*
People who fall asleep at work or school are lazy or have bad habits	29 (63.0)	8 (17.4)	9 (19.6)	27 (58.7	12 (26.1)	7 (15.2)
When growing up my parents emphasized the importance of sleep to me	8 (17.4)	8 (17.4)	30 (65.2)	9 (19.6)	7 (15.2)	30 (65.2)
It is important for children who are growing up to get healthy sleep	0	0	46 (100)	0	0	46 (100)
Getting healthy sleep is important for adults	1 (2.2)	0	45 (97.8)	1 (2.2)	1 (2.2)	44 (95.7)
Getting healthy sleep is important for older adults/seniors	1 (2.2)	0	45 (97.8)	0	3 (6.5)	43 (93.5)
I think my sleep is important	0	0	46 (100)	0	0	46 (100)

Frequency (percentage) reported. *45 paternal responses

Table 30. Maternal and paternal responses to SPAQ-A-P

	Mothers (n=46)			Fathers (n=46)		
	Disagree to some extent	Unsure	Agree to some extent	Disagree to some extent	Unsure	Agree to some extent
I would try to do the following if I am feeling sleepy during the day:						
sleep more at night or sleep better	5 (10.9)	0	41 (89.1)	5 (10.9)	2 (4.3)	38 (82.6)*
nap during the day	20 (43.5)	6 (13)	20 (43.5)	31 (67.4)	0	14 (30.4)*
increase caffeine from coffee, tea, fizzy or energy drinks	26 (56.5)	2 (4.3)	18 (39.1)	13 (28.3)	5 (10.9)	27 (58.7)*
increase exercise or physical activity	16 (34.8)	9 (19.6)	21 (45.7)	16 (34.8)	9 (19.6)	20 (43.5)*
I never feel sleepy	42 (91.3)	0	1 (2.2)+	36 (78.3)	1 (2.2)	4 (8.7)^
I would try to do the following if I were having trouble sleeping tonight:						
stay in bed and get some rest	3 (6.5)	4 (8.7)	39 (84.8)	10 (21.7)	8 (17.4)	27 (58.7)*
do something in bed (like read or watch TV)	16 (34.8)	4 (8.7)	26 (56.5)	21 (45.7)	1 (2.2)	24 (52.2)
get up and do something (like read or watch TV)	29 (63)	6 (13)	11 (23.9)	27 (58.7)	4 (8.7)	15 (32.6)
eat or drink something	39 (84.8)	3 (6.5)	4 (8.7)	34 (73.9)	3 (6.5)	8 (17.4)*
drink alcohol	46 (100)	0	0	44 (95.7)	0	2 (4.3)
smoke	46 (100)	0	0	45 (97.8)	0	1 (2.2)
drink a caffeinated beverage such as coffee, tea, fizzy or energy drinks	45 (97.8)	0	1 (2.2)	44 (95.7)	0	1 (2.2)*
get up and start the day	30 (65.2)	9 (19.6)	7 (15.2)	22 (47.8)	12 (26.1)	9 (19.6)**
I would try to do the following if I were having trouble sleeping over a period of time:						
take medication to help me sleep	37 (80.4)	7 (15.2)	2 (4.3)	33 (71.7)	10 (21.7)	3 (6.5)
make sure my mattress is comfortable and buy a new one if needed	8 (17.4)	12 (26.1)	26 (56.5)	14 (30.4)	8 (17.4)	24 (52.2)
make sure I go to bed at a good time	1 (2.2)	3 (6.5)	42 (91.3)	1 (2.2)	4 (8.7)	41 (89.1)
adjust the lighting in my bedroom	9 (19.6)	4 (8.7)	33 (71.7)	10 (21.7)	10 (21.7)	26 (56.5)
adjust the temperature in my bedroom	2 (4.3)	6 (13)	38 (82.6)	10 (21.7)	8 (17.4)	28 (60.9)
change my sleep schedule by going to bed or waking up at a different time	5 (10.9)	9 (19.6)	32 (69.6)	8 (17.4)	9 (19.6)	29 (63.0)
reduce my intake of caffeine	8 (17.4	3 (6.5	35 (76.1)	11 (23.9)	10 (21.7)	25 (54.3)
make sleep a priority in my life	4 (8.7)	11 (23.9)	31 (67.4)	13 (28.3)	16 (34.8)	17 (37)
I do the following in bed:						
read	7 (15.2)	2 (4.3)	37 (80.4)	18 (39.1)	1 (2.2)	26 (56.5)*
watch TV or an electronic device	19 (41.3)	2 (4.3)	25 (54.3)	18 (39.1)	2 (4.3)	26 (56.5)
eat or drink	43 (93.5)	0	3 (6.5)	43 (93.5)	1 (2.2)	2 (4.3)
worry or spend time thinking	13 (28.3)	7 (15.2)	26 (56.5)	16 (34.8)	5 (10.9)	25 (54.3)
argue or be angry	39 (84.8)	3 (6.5)	4 (8.7)	37 (80.4)	4 (8.7)	5 (10.9)
do work	40 (87.0)	3 (6.5)	3 (6.5)	40 (87.0)	2 (4.3)	4 (8.7)
The place where I sleep is:						
physically comfortable (mattress, pillows etc)	0	0	46 (100)	3 (6.5)	1 (2.2)	42 (91.3)
dark	2 (4.3)	3 (6.5)	41 (89.1)	5 (10.9)	1 (2.2)	40 (87.0)
a comfortable temperature	1 (2.2)	3 (6.5)	42 (91.3)	3 (6.5)	4 (8.7)	39 (84.8)
quiet	1 (2.2)	2 (4.3)	43 (93.5)	1 (2.2)	3 (6.5)	42 (91.3)

Frequency (percentage) reported. +43 maternal responses, *45 paternal responses, ^41 paternal responses, ** 43 paternal responses

7.1.5. Parental cognitions, knowledge, and practices relating to their child's sleep

Maternal and paternal responses to the PCISQ which provides an indication of parental cognitions about their child's sleep, the SPAQ-C-K which provides an indication of level of parental knowledge about child sleep, and the SPAQ-C-P which provides an indication of sleep-related practices with their child are displayed in Table 31. Higher scores indicate increased levels of cognitions which reflect concerns and worries about their child sleep, poorer knowledge about child sleep, and the endorsement of more negative sleep-related practices with their child respectively.

Table 31. Comparison of parental cognitions, knowledge, and practices relating to child sleep

		Mothers (n= 46)			Fathers (n=46)		
	Possible range	Mean (SD)	Min	Max	Mean (SD)	Min	Max
PCISQ*	0-85	30.11 (7.86)	13	48	29.24 (6.30)	17	45
SPAQ-C-K*	10-50	17.48 (3.56)	10	26	17.87 (3.20)	12	28
SPAQ-C-P	20-100	38.04 (6.97)	24	53	39.33 (6.94)	26	51

*45 paternal responses

There was no significant difference between maternal and paternal parental cognitions relating to overall concerns about their child's sleep (total PCISQ scores), t(89) =0.58, *p*=.565.

There were also no significant differences between maternal and paternal knowledge relating to child sleep (SPAQ-C-K), t(89)=0.55, *p*=.586, nor in their sleep-related practices relevant to their child's sleep (SPAQ-C-P), U=942.5, N=92, *p*=.366.

To further explore parental cognitions about child sleep, PCISQ subscales that assess specific domains of parental concerns about child sleep, are displayed in Table 32.

Table 32. Comparison of maternal and paternal cognitions about child sleep (PCISQ) subscale and total scores

		Mothers (n=46)			Fathers (n=45)		
	Possible range	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Setting limits	0-25	12.5 (2.53)	5	16	11.53 (3.00)	1	20
Anger	0-25	5.20 (2.37)	1	10	6.42 (2.87)	1	15
Doubt	0-25	9.09 (3.79)	3	22	8.71 (2.97)	3	15
Safety	0-10	3.33 (2.22)	0	9	2.58 (1.99)	0	7

There was a significant difference in parental cognitions relating to setting limits between mothers (*Mdn*=13, *IQR*=3) and fathers (*Mdn*=12, *IQR*=3), U=771.5, N=91, *p*=.035. There was also a significant difference in the parental cognitions regarding feelings of anger between mothers (*Mdn*=5, *IQR*=4) and fathers (*Mdn*=6, *IQR*=4), U=782.5, N=91, *p*=.043. This suggests that in comparison to fathers, mothers, held increased levels of concerns about setting limits on their child's behaviour and resisting their demands, whereas fathers felt higher levels of anger, than mothers, towards their child's demands. There was no significant difference between maternal and paternal cognitions relating to doubt and safety (U=1034, N=91, *p*=.994; U=840.5, N=91, *p*=.119 respectively).

As the child SPAQ questionnaires (practices, P and knowledge, K) were designed to be interpreted descriptively and to allow comparison with other samples, item-by-item maternal and paternal responses to the SPAQ-C-K and the SPAQ-C-P are presented in Tables 33 and 34 respectively.

Table 33. Maternal and paternal responses to SPAQ-C-K items

	Mothers (n=46)			Fathers (n=45)		
	Disagree to some extent	Unsure	Agree to some extent	Disagree to some extent	Unsure	Agree to some extent
My child's day affects how much they sleep	5 (10.9)	4 (8.7)	37 (80.4)	6 (13)	1 (2.2)	38 (82.6)
Our home/family environment affects how much my child sleeps	8 (17.40	7 (15.2)	31 (67.4)	5 (10.9)	12 (26.1)	28 (60.9)
My child's sleep is affected by medical conditions (like heart, breathing, or pain)	39 (84.8)	1 (2.2)	6 (13)	30 (65.2)	6 (13)	9 (19.6)
Sometimes if my child is feeling upset, it affects their sleep	12 (26.1)	10 (21.7)	24 (52.2)	9 (19.6)	10 (21.7)	26 (56.5)
I care about making sure that my child has enough time to sleep	0	1 (2.2)	45 (97.8)	0	0	45 (97.8)
Getting enough good quality sleep is important for my child to be able to enjoy the day	1 (2.2)	1 (2.2)	44 (95.7)	0	0	45 (97.8)
Getting my child to sleep at a good time is important to me	1 (2.2)	1 (2.2)	44 (95.7)	1 (2.2)	1 (2.2)	43 (93.5)
Sleep is important to my child's health	0	1 (2.2)	45 (97.8)	0	0	45 (97.8)
If my child does not get enough sleep this can lead to serious consequences	0	11 (23.9)	35 (76.1)	3 (6.5)	5 (10.9)	37 (80.4)
Poor sleep affects the quality of my child's life	7 (15.2)	4 (8.7)	35 (76.1)	5 (10.9)	6 (13.0)	34 (73.9)
My child's health professional has discussed the importance of a regular sleep schedule for my child	28 (60.9)	4 (8.7)	14 (30.4)	25 (54.3)	10 (21.7)	10 (21.7)
My child's health professional has discussed the importance of my child getting enough sleep	30 (65.2)	3 (6.5)	13 (28.3)	25 (54.3)	10 (21.7)	10 (21.7)
If my child is really bored, they might fall asleep, even if they slept well the night before	37 (80.4)	6 (13)	3 (6.5)	33 (71.7)	10 (21.7)	2 (4.3)
If my child lies in bed with their eyes shut that is as good as sleeping	37 (80.4)	8 (17.4)	1 (2.2)	35 (76.1)	10 (21.7)	0
I can tell when my child is sleepy	1 (2.2)	1 (2.2)	44 (95.7)	0	0	44 (95.7)*
Children who fall asleep at nursery or school are lazy or have bad habits	42 (91.3)	3 (6.5)	1 (2.2)	37 (80.4)	6 (13.0)	2 (4.3)
I prioritise the importance of sleep to my child	1 (2.2)	3 (6.5)	42 (91.3)	0	6 (13.0)	39 (84.8)
Getting enough good quality sleep is important for children when they are growing up	0	1 (2.2)	45 (97.8)	0	0	45 (97.8)
I think my child's sleep is important	0	0	46 (100)	0	0	45 (97.8)

Frequency (percentage) reported. *44 paternal responses

Table 34. Maternal and paternal responses to SPAQ-C-P items

	Mothers (n= 46)			Fathers (n=46)		
	Disagree to some extent	Unsure	Agree to some extent	Disagree to some extent	Unsure	Agree to some extent
I would try to do the following if my child seems sleepy during the day:						
try and help them sleep more or sleep better	3 (6.5)	1 (2.2)	42 (91.3)	1 (2.2)	4 (8.7)	39 (84.8)**
put them down for a nap	0	1 (2.2)	45 (97.8)	1 (2.2)	1 (2.2)	44 (95.7)
increase physical activity or play	26 (56.5)	5 (10.9)	14 (30.4)+	18 (39.1)	10 (21.7)	16 (34.8)**
My child never seems sleepy	39 (84.8)	5 (10.9)	1 (2.2)+	40 (87.0)	1 (2.2)	1 (2.2)^
I would try to do the following if my child were having trouble sleeping tonight:						
leave them in bed to try and get some rest	9 (19.6)	5 (10.9)	32 (69.6)	12 (26.1)	4 (8.7)	30 (65.2)
give them something to do in bed (like toys or books)	40 (87.0)	1 (2.2)	5 (10.9)	29 (63.0)	7 (15.2)	10 (21.7)
get them up and out of bed to do something (like play, read, watch TV)	35 (76.1)	4 (8.7)	7 (15.2)	32 (69.6)	3 (6.5)	11 (23.9)
give them something to eat or drink	19 (41.3)	6 (13)	21 (45.7)	17 (37.0)	10 (21.7)	19 (41.3)
get them up and out of bed to start the day	33 (71.7)	9 (19.6)	4 (8.7)	34 (73.9)	5 (10.9)	7 (15.2)
I would try to do the following if my child were having trouble sleeping over a period of time:						
give medication to help them sleep	42 (91.3)	3 (6.5)	1 (2.2)	42 (91.3)	4 (8.7)	0
make sure my child's mattress is comfortable and buy a new one if needed	8 (17.4)	6 (13)	32 (69.6)	2 (4.3)	8 (17.4)	36 (78.3)
make sure my child goes to bed at a good time	0	0	46 (100)	0	1 (2.2)	44 (95.7)*
adjust the lighting in my child's bedroom	1 (2.2)	1 (2.2)	44 (95.7)	3 (6.5)	4 (8.7)	38 (82.6)*
adjust the temperature in my child's bedroom	0	1 (2.2)	45 (97.8)	1 (2.2)	0	44 (95.7)*
change my child's sleep schedule so they go to bed or wake up at a different time	1 (2.2)	15 (32.6)	30 (65.2)	5 (10.9)	13 (28.3)	27 (58.7)*
make my child's sleep a priority in my life	0	3 (6.5)	43 (93.5)	2 (4.3)	4 (8.7)	39 (84.8)*
My child does the following in bed:						
is read to	30 (65.2)	1 (2.2)	15 (32.6)	24 (52.2)	1 (2.2)	21 (45.7)
watches TV or an electronic device	44 (95.7)	0	2 (4.3)	44 (95.7)	1 (2.2)	1 (2.2)
eat or drink	30 (65.2)	0	16 (34.8)	32 (69.6)	1 (2.2)	13 (28.3)
play	29 (63)	6 (13)	11 (23.9)	31 (67.4)	2 (4.3)	13 (28.3)
The place where my child sleeps is:						
physically comfortable (mattress, pillows etc)	0	1 (2.2)	45 (97.8)	0	0	46 (100)
dark	0	1 (2.2)	97.8)	1 (2.2)	1 (2.2)	44 (95.7)
a comfortable temperature	1 (2.2)	2 (4.3)	43 (93.5)	0	1 (2.2)	45 (97.8)
quiet	0	2 (4.3)	44 (95.7)	2 (4.3)	1 (2.2)	43 (93.5)

Frequency (percentage) reported. +45 maternal responses, *45 paternal responses, ** 44 paternal responses, ^42 paternal responses

7.1.6. Parental bedtime behaviours used with child

In addition to assessing these parental sleep-related practices in relation to child sleep as described above, the PIBBS was also used to assess the specific methods used by parents to settle their children to sleep. Table 35 provides an overview of the level of parental endorsement for different methods. Scores represent the percentage of endorsement of each type of method and accordingly could range from 0-100.

There was no significant difference between maternal and paternal endorsement of active physical comforting (U=1006, N=92, *p*=.684); encourage autonomy (U=973, N=92, *p*=.503); settle by movement (U=938.5, N=92, *p*=.319); passive physical comforting (U=1020, N=92, *p*=.763); and social comforting, (t(90)=0.82, *p*=.415). There was also no significant difference between maternal and paternal total PIBBS score, t(90)=0.24, *p*=.808.

The scores for the 'encourage autonomy' subscale and the total score are also displayed with the additional item, as detailed in section 6.2.2. There was no significant difference between maternal and paternal endorsement of the encourage autonomy subscale with the added item, t(89)=1.09, *p*=.279, or for the PIBBS total score using the subscale with the additional item, t(89)=-.18, *p*=.862. Therefore no further statistical analyses were performed on these scores.

Table 35. Comparison of maternal and paternal PIBBS subscale and total scores

	Mothers (n=46)			Fathers (n=46)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Active physical	32.61 (19.71)	0	79.17	33.51 (21.64)	0	75
Encourage autonomy	42.75 (25.50)	0	100	39.31 (20.54)	0	83.33
Settle by movement	23.10 (28.50)	0	100	16.30 (22.50)	0	87.5
Passive physical	28.26 (22.12)	0	75	30.16 (23.65)	0	100
Social comfort	43.21 (21.36)	0	87.5	46.88 (21.64)	0	87.5
PIBBS total score	36.88 (12.72)	7.92	64.17	37.51 (11.97)	10	62.08
Encourage autonomy with added item	49.32 (24.16)	0	100	44.31 (19.53)	0	87.5
PIBBS total score with added item*	35.57 (13.46)	6.25	65	30.05 (12.44)	10	62.5

* PIBBS total score including encourage autonomy subscale with additional item

7.1.7. Parental dyad congruence for cognitions and practices relating to adult and child sleep, and for the methods used to settle children to sleep

Parental agreement level across parental cognitions (about adult and child sleep), sleep-related practices (relating to adult and child sleep), and bedtime behaviours used with their child are presented in Table 36.

Table 36. Level of parental agreement for cognitions and practices relating to adult and child sleep and bedtime behaviours used with child

	Maximum score	Mean (SD)	Min	Max	Mean % agreement
DBAS	16	10.76 (2.07)	7	15	67.25
SPAQ-A-P	31	19.93 (3.24)	12	26	64.29
PCISQ	19	12.38 (2.15)	7	16	65.16
SPAQ-C-P	24	18.80 (2.89)	10	24	78.33
PIBBS	20	13.93 (2.71)	9	19	69.65

Parents were fairly consistent in their level of agreement for cognitions relating to both their own and their child's sleep (DBAS and PCISQ), for their sleep-related practices relating to their own sleep (SPAQ-A-P), and bedtime behaviours with their child (PIBBS). However, there was noticeably increased agreement for their sleep-related practices with their child (SPAQ-C-P).

7.2. Child variables – descriptive statistics

7.2.1. Parentally reported child sleep

Both mothers and fathers reported on their child's sleep via the BISQ and as an additional measure of child sleep also the CSDI (total scores). Responses are displayed in Table 37.

Table 37. Comparison of parentally reported child sleep variables

	Mothers (n=46)			Fathers (n=45)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
BISQ						
Nocturnal sleep duration (hrs)	10.71 (.84)	8	12	10.45 (1.30)	5.5	12
Daytime sleep duration (hrs)^	1.95 (.64)	0	3.5	1.87 (.57)	.75	3.5
Total sleep duration (hrs)^	12.66 (1.04)	10.25	15	12.33 (1.35)	8	15
Sleep onset time (time)	7.66 (.70)	6	9.75	7.69 (.70)	9	9.5
Settling time (hrs)	.40 (.33)	0	1.5	.41 (.41)	0	2.41
Night-waking (number)^	1.04 (1.23)	0	4	1.06 (1.13)	0	4
Nocturnal wakefulness (hrs)*^	.26 (.41)	0	2	.33 (.52)	0	2.5
CSDI						
Total score^	3.02 (2.34)	0	8	2.93 (2.71)	0	11

All BISQ times are decimalised for presentation. *45 maternal responses, ^44 paternal responses

As detailed in section 6.2.4, there were 2 subjective assessment methods by which child sleep could be categorised as problematic in this study. The percentage of children who were classified as having a CSP as reported by mothers and fathers based on parental report and research definition, are shown in Figures 8 and 9.

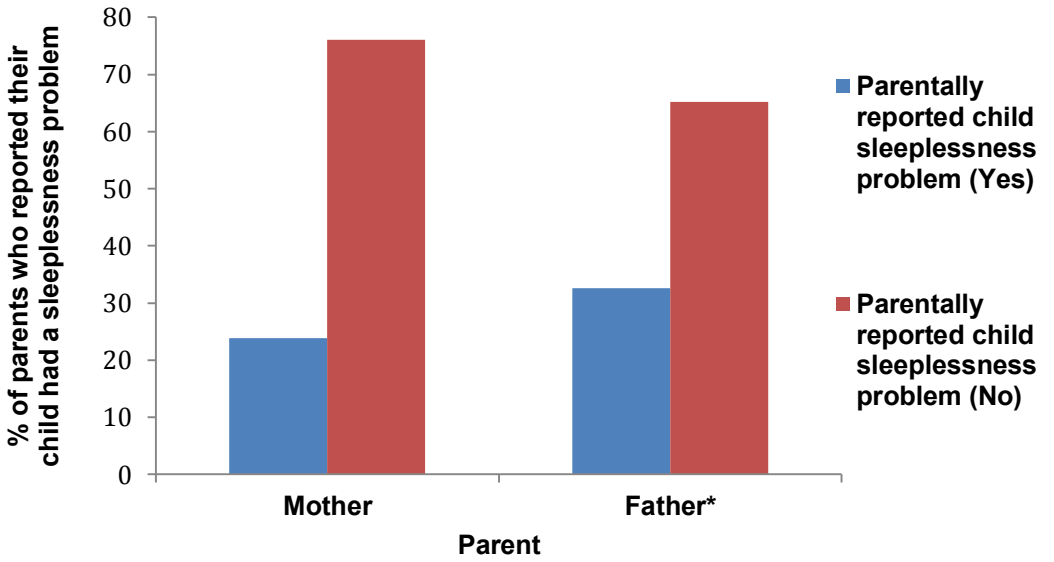

Figure 8. The percentage of children whose parents reported their child suffered from a CSP based on BISQ parental report item *45 paternal responses

When maternal and paternal responses to parental perception of CSPs were applied, as shown in Figure 8, 11 (23.9%) children were reported by mothers and 15 (32.6%) children were reported by fathers as having a CSP. Higher proportions of parents, 35 (76.1%) mothers and 30 (65.2%) fathers reported they did not perceive their child to have a CSP. For 1 (2.2%) child there was no BISQ parental perception classification, due to missing data from the original questionnaire.

When parental perception of a CSP was compared within each parental dyad, 26 (56.5%) children were reported as having no CSP according to both mother and father. Only 7 (15.2%) children were reported by both mothers and fathers to have a CSP. However, there were discrepancies between some parents, 4 (8.7%) children were reported by mothers but not fathers to have a CSP whereas 8 (17.4%) children were reported by fathers but not mothers to have a CSP.

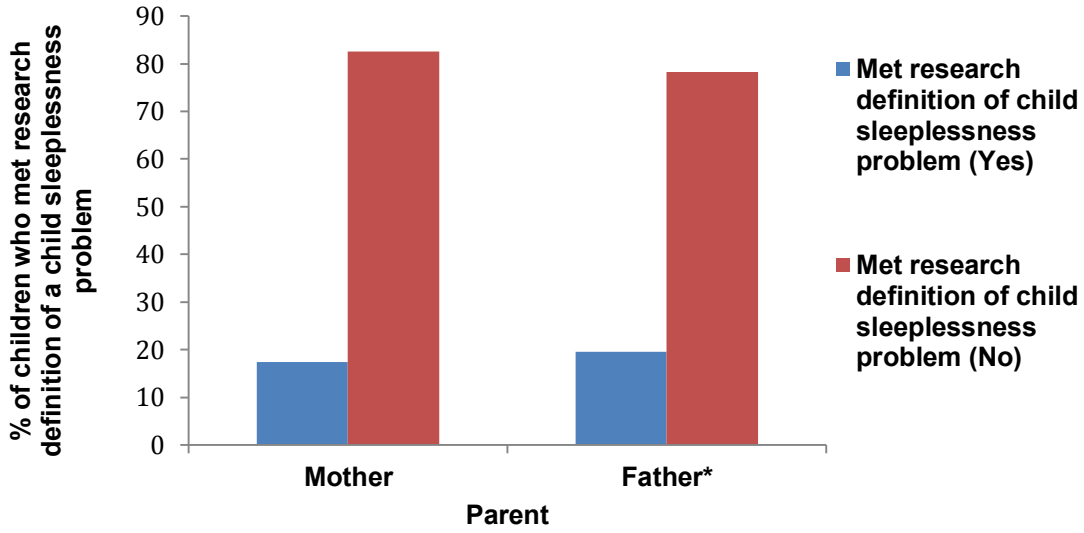

Figure 9. The percentage of children who met BISQ defined research definition of a CSP *45 paternal responses

When the research definition of a CSP was used, as shown in Figure 9, 38 (82.6%) children did not meet the criteria for CSPs according to maternal report data and 36 (78.3%) for paternal report data. However, 8 (17.4%) and 9 (19.6%) children met the criteria for a research definition for a CSP based on maternal and paternal report data respectively.

When compared across parental dyads a large proportion of 34 (73.9%) of children did not meet the research definition of a CSP based on either maternal or paternal reporting on aspects of their child's sleep. Only 5 (10.9%) children met the criteria based on both parents reporting. However, there were discrepancies between parents for 6 (13%) children; 4 (8.7%) met the research definition criteria based on paternal but not maternal report of their child sleep, while 2 (4.4%) children met the research definition based on maternal but not paternal reporting. Only 1 (2.2%) child was missing a research definition classification due to missing parental report questionnaire data.

7.2.2. Child objectively measured sleep

Actigraphy analysis was conducted on 43 children (27 females and 19 males). Data for 3 children was omitted due to poor raw actigraphy and/or regular co-sleeping. A mean number of 5.09 (*SD*=.53) nights of data was collected (based on a minimum of 4 to a maximum of 7 nights data from individual children). See Table 38 for an overview of actigraphy variables.

There were no significant differences between any objectively measured child sleep variables between children who were parentally (PNCG) reported as having a CSP and those who were not reported to suffer from a CSP. This data is presented in Table 38.

Table 38. Children's decimalised actigraphy variables

	Mean (SD) whole sample (n=43)	Min	Max	Mean (SD) PNCG CSP Yes (n=10)	Mean (SD) PNCG CSP No (n=33)	Difference tests*
Bedtime	7.49 (.68)	5.73	8.85	7.83 (.74)	7.39 (.64)	U=110.5, N=43, *p*=.118
Sleep start time	7.93 (.69)	6.31	9.54	8.24 (.81)	7.84 (.64)	t(41)=1.66, *p*=.104
Sleep onset latency	25.91 (18.51)	.60	81.80	24.28 (20.83)	26.41 (18.07)	U=148, N=43, *p*=.640
Wake-up time	6.48 (.73)	5.09	7.88	6.64 (.78)	6.44 (.72)	t(41)=.78, *p*=.442
Get up time	7.09 (.68)	5.71	8.93	7.12 (.57)	7.08 (.71)	t(41)=.18, *p*=.856
Sleep efficiency	76.33 (8.02)	53.96	93.12	75.67 (10.14)	76.53 (7.43)	t(41)=.30, *p*=.770
Activity (mean)	18.49 (5.45)	7.94	33.92	19.80 (6.65)	18.10 (5.09)	t(41)=.86, *p*=.395
Sleep minutes	529.99 (52.24)	341.40	625.80	512.86 (69.80)	535.18 (45.74)	t(41)=1.19, *p*=.241
Wake after sleep onset	103.97 (45.00)	11.00	224.40	112.02 (48.61)	101.53 (44.35)	t(41)=.64, *p*=.525
Sleep fragmentation index	.94 (.30)	.20	1.49	.99 (.29)	.93 (.31)	t(41)=.52, *p*=.604

*Difference between objectively measured child sleep variables compared by parental (PNCG) perception of CSP

7.2.3. Child temperament

Child temperament (as assessed by the CCQ) total score and the 'difficult' subscale score based on maternal and paternal report is shown in Table 39.

Table 39. Comparison of parental reporting on child temperament (CCQ)

	Maternal (n=46)			Paternal (n=45)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
CCQ difficult score	22.89 (5.77)	11	42	24.11 (5.44)	13	42
CCQ total score	104.59 (14.71)	78	136	106.98 (16.10)	64	141

CCQ difficult score (possible range 7-49), CCQ total score (possible range 32-224)

When CCQ temperament bandings were applied, based on mothers' report, 22 (47.8%) children were classified as easy, 22 (47.8%) as average, while 2 (4.3%) were difficult. Based on fathers' reporting, 12 (26.1%) children were classified as easy, 31 (67.4%) as average, and 2 (4.3%) as difficult.

There were no significant differences between maternal and paternal reporting on their perception of their child's temperament (CCQ total score), $t(89)=0.74$, $p=.461$.

7. 3. Research questions

7.3.1. Are there associations between the objectively assessed sleep of the primary night-time caregiver and their child?

Correlations were used to explore the relationships between PNCG and child actigraphy sleep variables (see Table 40).

Notable positive associations were found between PNCG and child bedtime (r_s=.44, p=.003), sleep start time (r=.50., p=.001), wake-up time (r_s=.69, p<.001), and get up time (r_s=.77, p<.001). This suggests that the overall timing of the PNCG's sleep (the time they go to bed, time they fall asleep, as well as wake-up and get up the next morning) was positively associated with these respective variables in their child's sleep.

PNCG sleep minutes were also positively associated with their child's wake-up time (r=.37, p=.013) and get-up time (r=.42, p=.005). This suggests that the amount of adult sleep minutes was significantly associated with the time at which the child woke up in the morning and was taken or got out of bed in the morning.

Table 40. Correlations of adult and child sleep variables

		Adult Actigraphy Variables									
		Bedtime	Sleep start time	Sleep onset latency^	Wake-up time^	Get up time^	Sleep efficiency^	Activity mean^	Sleep mins	Wake after sleep onset^	Sleep fragmentation index^
Child Actigraphy variables	Bedtime^	**.44****	**.42****	-.10	**.34***	**.41****	-.01	-.14	-.08	-.04	-.16
	Sleep start time	**.50****	**.50****	.06	**.50****	**.53****	-.07	-.08	.00	.04	-.07
	Sleep onset latency^	.12	.12	.19	.25	.16	-.03	-.01	.08	.09	.08
	Wake-up time	**.37***	**.38***	-.07	**.69****	**.65****	.17	-.12	**.37***	-.17	-.19
	Get up time	**.50****	**.52****	-.02	**.79****	**.77****	.19	-.20	**.42****	-.21	-.24
	Sleep efficiency	-.07	-.16	**-.33***	-.18	-.20	.23	-.16	-.05	-.21	-.26
	Activity mean^	.01	.09	.24	.19	.20	-.21	.26	.04	.20	.25
	Sleep mins^	-.01	-.12	**-.38***	-06	-.01	**.41****	**-.33***	.23	**-.39****	**-.39****
	Wake after sleep onset	-.02	.07	.23	.27	.25	-.16	.19	.12	.15	.24
	Sleep fragmentation index	-.05	.04	.25	.07	.07	-.13	.10	.00	.08	.19

*p<.05, **p<.01, all other correlations non-significant. ^ denotes non-normally distributed variable and Spearman Rho correlation coefficients reported. Red highlighted correlations are those that remain significant with Bonferroni correction of adjusted *p*=.005 applied

Table 41. Correlations of PNCG sleep variables and cognitions relating to their own sleep

	PNCG Actigraphy Variables									
	Bedtime	Sleep start time	Sleep onset latency	Wake-up time	Get up time	Sleep efficiency	Activity mean	Sleep mins	Wake after sleep onset	Sleep fragmentation index
Cognitions about own sleep (DBAS)	-.11	-.11	.04	-.04	-.04	.03	-.04	.06	-.04	.09

All correlations non-significant

7.3.2. Are parental cognitions about their own sleep related to their objectively assessed sleep?

There were no significant correlations between PNCG cognitions relating to their own sleep (DBAS) and any of the objective sleep variables derived from PNCG actigraphy data (results presented in Table 41).

7.3.3. Are parental reports of child sleep predictive of objectively assessed child sleep?

A hierarchical linear regression model was run to explore the predictive nature of maternal and paternal subjective reporting of the presence of a CSP (parental report of CSP, BISQ item) on objectively measured child sleep (actigraphy).

The hierarchical linear regression model using maternal and paternal perception of a CSP (yes/no) to predict objectively measured child sleep (sleep efficiency determined by actigraphy) was not significant, $F(2,40)=2.31$, $p=.113$. See Table 42 for summary.

Table 42. Summary of regression analysis for predicting objectively measured child sleep

		B	Std. Error	Beta	p
Step 1	Constant	74.81	5.32		
	Maternal perception of CSP	.86	2.93	.05	.770
Step 2	(Constant)	80.76	5.82		
	Maternal perception of CSP	3.14	3.01	.17	.302
	Paternal perception of CSP	**-5.88**	**2.76**	**-.34**	**.040**

Maternal perception of their child having a CSP was not predictive of the quality of the child's objectively (actigraphically) assessed sleep. However, paternal perception of a CSP was a significant predictor. Specifically, paternal perception of their child having a CSP, unexpectedly, predicted improved child sleep efficiency.

7.3.4. Are there associations between parental cognitions, knowledge, and practices relating to their own and their child's sleep?

Correlations were used to explore the relationship between maternal and paternal cognitions, knowledge and practices between their own and their child's sleep. Data for mothers are presented in Table 43 and Table 44 for fathers.

Results were fully in line with the prediction that dysfunctional parental cognitions about their own sleep, would be associated with cognitions that reflected higher levels of parental concerns about their child's sleep, for both mothers and fathers, although cognitions about their own sleep were associated with different types of cognitions about their child's sleep across mothers and fathers. For mothers, dysfunctional cognitions about their own sleep (DBAS) were positively associated with cognitions about their child's sleep relating to overnight safety and general levels of worry and concerns (total PCISQ scores) about their child's sleep (r=.39, p=.008; r=.37, p=.013 respectively). While for fathers, dysfunctional cognitions about their own sleep (DBAS) were positively associated with cognitions about their child's sleep relating to feelings of anger towards their child's demands and general levels of worry and concerns (total PCISQ scores) about their child's sleep (r_s=.44, p=.002; r=.45, p=.002 respectively).

The hypothesis that increased use of positive sleep-related practices relating to their own sleep (represented by lower SPAQ-A-P scores) would be associated with higher levels of positive sleep-related practices in relation to their child's sleep (represented by lower SPAQ-C-P scores) was partially supported, being upheld for mothers, but not for fathers. Maternal sleep-related practices for their own sleep were positively associated with the practices employed in relation to their child's sleep (r=.46, p=.001) and also the use of active physical bedtime behaviours (r_s=.32, p=.033). There was no evidence to support the hypothesis that higher level of knowledge relating to parents own sleep was associated with higher levels of knowledge about child sleep.

It was also found that increased parental knowledge about child sleep (represented by lower SPAQ-C-K scores) was associated with the use of optimal parental sleep-related practices with their child (represented by lower SPAQ-C-P scores) for both mothers and fathers. Specifically, parental knowledge about child sleep was positively associated with parental sleep-related practices in relation to child sleep for mothers (r=.41, p=.004) and fathers (r=.57, p<.001). Level of parental knowledge about child sleep was associated with the use of specific types of bedtime behaviours; poorer knowledge about child sleep was positively associated with the endorsement of active physical bedtime behaviours for mothers (r_s=.45, p=.002) and fathers (r=.31, p=.038). Poorer maternal knowledge was also negatively associated with the endorsement of bedtime practices that encourage child autonomy (r=-.30, p=.042).

Table 43. Correlations of maternal cognitions, practices, and knowledge relating to their own and their child's sleep and method used to settle child to sleep

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Cognitions about own sleep (DBAS)	1.00														
2. Knowledge about own sleep (SPAQ-A-K)^	.16	1.00													
3. Sleep-related practices (SPAQ-A-P)	.10	.25	1.00												
4. Maternal cognitions, setting limits (PCISQ)^	.17	.08	.24	1.00											
5. Maternal cognitions, anger (PCISQ)^	.26	.08	.24	**.33***	1.00										
6. Maternal cognitions, doubt (PCISQ)	.25	.18	-.03	**.38****	.26	1.00									
7. Maternal cognitions, safety (PCISQ)^	**.39****	.04	.13	**.31***	.12	**.57****	1.00								
8. Maternal cognitions about child sleep (PCISQ)	**.37***	.14	.18	**.66****	**.57****	**.83****	**.67****	1.00							
9. Maternal knowledge about child sleep (SPAQ-C-K)	.20	.28	**.31***	.03	.21	.11	-.06	-.01	1.00						
10. Maternal practices relating to child sleep (SPAQ-C-P)	.03	.10	**.46****	-.03	.19	-.16	.05	.01	**.41****	1.00					
11. Active physical settling (PIBBS)	.05	-.04	**.32***	.20	.11	.11	.21	.20	**.45****	**.51****	1.00				
12. Encourage autonomy settling (PIBBS)^	-.18	.16	-.24	.01	-.07	.16	.06	.06	**-.30***	-.14	**-.43****	1.00			
13. Settle by movement (PIBBS)^	.19	.11	.20	**.34***	**.31***	**.39****	**.30***	**.48****	.09	.05	**.31***	-.02	1.00		
14. Settle by passive physical (PIBBS)^	.02	-.07	.17	**.29***	**.53****	.20	.15	**.39****	.20	.01	.28	-.08	**.29***	1.00	
15. Settle by social (PIBBS)	-.15	-.20	-.15	.03	-.07	.17	.12	.09	-.21	-.06	.16	**.37***	-.01	.13	1.00

*p<.05. **p<.01, all other correlations non-significant. ^ denotes non-normally distributed variable and Spearman Rho correlation coefficients reported. Red highlighted correlations are those that remain significant with Bonferroni correction of adjusted *p*=.004 applied

Table 44. Correlations of paternal cognitions and practices relating to their own and their child's sleep and method used to settle their child

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Cognitions about own sleep (DBAS)	1.00														
2. Knowledge about own sleep (SPAQ-A-K)^	-.04	1.00													
3. Sleep-related practices (SPAQ-A-P)	-.03	-.04	1.00												
4. Paternal cognitions, setting limits (PCISQ)^	.18	.06	-.21	1.00											
5. Paternal cognitions, anger (PCISQ)^	**.44****	.15	**.33***	.05	1.00										
6. Paternal cognitions, doubt (PCISQ)	.21	-.01	-.16	.28	-.01	1.00									
7. Paternal cognitions, safety (PCISQ)^	.13	-.07	-.17	.17	**-.30***	**.43****	1.00								
8. Paternal cognitions about child sleep (PCISQ)	**.45****	.02	-.08	**.67****	**.36****	**.72****	**.46****	1.00							
9. Paternal knowledge relating to child sleep (SPAQ-C-K)	-.14	.27	.23	-.26	.21	-.05	-.20	-.12	1.00						
10. Paternal practices relating to child sleep (SPAQ-C-P)	-.16	.18	.21	-.02	**.30***	.18	-.25	.12	**.57****	1.00					
11. Active physical settling (PIBBS)	-.19	.19	.01	**-.31***	.02	-.14	-.16	-.28	**.31***	.29	1.00				
12. Encourage autonomy settling (PIBBS)^	-.11	-.10	-.12	-.16	-.14	.02	.23	-.04	.04	.13	.12	1.00			
13. Settle by movement (PIBBS)^	-.05	-.10	-.07	-.24	.01	.09	-.02	-.06	.13	.25	**.55****	.15	1.00		
14. Settle by passive physical (PIBBS)^	-.07	**-.32***	.03	-.16	-.03	-.25	-.16	-.20	-.20	-.15	.25	.13	.16	1.00	
15. Settle by social (PIBBS)	**-.33***	.10	.24	**-.32***	-.01	-.11	-.02	-.24	.21	.19	**.58****	**.36***	.23	.15	1.00

*p<.05. **p<.01, all other correlations non-significant. ^ denotes non-normally distributed variable and Spearman Rho correlation coefficients reported. Red highlighted correlations are those that remain significant with Bonferroni correction of adjusted *p*=.004 applied

7.3.5. Are parental cognitions, practices, and knowledge concerning their own and their child's sleep associated with (i) parental reporting of child night-wakings and (ii) the child's actigraphy assessed sleep?

Statistical analyses reported thus far allowed for the use of categorical variables as a measure of child sleep and as such the presence of parentally reported CSP (yes/no) has been extensively used. However, for this correlational analysis a continuous variable was required. Number of parentally reported night-wakes provides parental perception of an aspect of their child's sleep and has been widely used as a parent report variable in the literature. Correlations were used to explore if maternal and paternal cognitions (DBAS and PCISQ), sleep-related practices (SPAQ-A-P and SPAQ-C-P), and knowledge (SPAQ-A-K and SPAQ-C-K) relating to their own and their child's sleep, and the specific methods parents used to settle their child (PIBBS) were associated with parentally reported (number of night wakes reported in the BISQ) and objectively measured child sleep (sleep efficiency as determined by actigraphy). Results for mothers are reported in Table 45 and for fathers in Table 46.

Table 45. Correlations of maternal cognitions, knowledge, and sleep-related practices relating to adult and child sleep, method used to settle child to sleep and child sleep (subjectively reported and objectively measured)

	BISQ night-wakes^	Objectively measured child sleep (actigraphy)
Cognitions about own sleep (DBAS)	-.06	.04
Knowledge about own sleep (SPAQ-A-K)	-.03	-.17
Sleep-related practices (SPAQ-A-P)	.22	.04
Maternal cognitions, setting limits (PCISQ)	.16	**.37***
Maternal cognitions, anger (PCISQ)	.27	.07
Maternal cognitions, doubt (PCISQ)	.07	.09
Maternal cognitions, safety (PCISQ)	.01	-.01
Maternal cognitions about child sleep (PCISQ)	.14	.18
Maternal knowledge relating to child sleep (SPAQ-C-K)	.18	.00
Maternal practices relating to child sleep (SPAQ-C-P)	.11	-.09
Active physical settling (PIBBS)	**.39****	.07
Encourage autonomy (PIBBS)	**-.42****	-.21
Settle by movement (PIBBS)	.08	.14
Settle by passive physical (PIBBS)	.27	.16
Settle by social (PIBBS)	-.22	.00
Encourage autonomy (added item)	**-.51****	-.18

*p<.05. **p<.01, all other correlations non-significant. ^ denotes non-normally distributed variable and Spearman Rho correlation coefficients reported. Red highlighted correlations are those that remain significant with Bonferroni correction of adjusted *p*=.003 applied

Table 46. Correlations of paternal cognitions, knowledge, and sleep-related practices relating to their own and child sleep, method used to settle child to sleep, and child sleep (subjectively reported and objectively measured)

	BISQ night-wakes^	Objectively measured child sleep (actigraphy)
Cognitions about own sleep (DBAS)	.02	-.17
Knowledge about own sleep (SPAQ-A-K)	.17	-.28
Sleep-related practices (SPAQ-A-P)	.26	-.09
Paternal cognitions, setting limits (PCISQ)	.11	.01
Paternal cognitions, anger (PCISQ)	**.37***	-.06
Paternal cognitions, doubt (PCISQ)	-.15	.00
Paternal cognitions, safety (PCISQ)	**-.36***	-.26
Paternal cognitions about child sleep (PCISQ)	.06	-.11
Paternal knowledge relating to child sleep (SPAQ-C-K)	.08	-.26
Paternal practices relating to child sleep (SPAQ-C-P)	.22	-.10
Active physical settling (PIBBS)	.12	-.08
Encourage autonomy (PIBBS)	**-.43****	-.10
Settle by movement (PIBBS)	.02	-.03
Settle by passive physical (PIBBS)	.13	.12
Settle by social (PIBBS)	.01	.10
Encourage autonomy (added item)	**-.51****	-.10

*p<.05. **p<.01, all other correlations non-significant. ^ denotes non-normally distributed variable and Spearman Rho correlation coefficients reported. Red highlighted correlations are those that remain significant with Bonferroni correction of adjusted *p*=.003 applied

No evidence was found to support the first prediction that higher levels of parental cognitions reflecting difficulties setting limits on and resisting their child's behaviour being associated with poorer child sleep. Unexpectedly, higher levels of maternal cognitions which reflect difficulties setting limits and resisting child demands were positively associated with objectively assessed child sleep, r=.37, p=.015. This suggests that children whose mothers reported having more concerns around setting limits had children with higher sleep efficiency (as determined by actigraphy). Less surprisingly, increased paternal feelings of anger towards their child was associated with increased paternal reporting of child night-waking, r_s=.37, p=.014.

The second prediction, that increased parental involvement in bedtime behaviours would be associated with poorer child sleep was partially supported; use of active physical comforting methods was positively associated with the number of parentally reported child night-wakes for mothers *(*r_s=.39, p=.007), but not for fathers. In addition, for both mothers and fathers, there were no significant relationships between their reported use of active and physical settling strategies with their child and the child's objectively assessed sleep.

The third prediction, that endorsing bedtime behaviours which encourage child autonomy would be related to better quality child sleep was partially supported.

Increased endorsement of bedtime behaviours which encouraged autonomy were negatively associated with number of child night-wakings and even more strongly negatively associated with number of night-wakings when the additional autonomy subscale item was included for mothers (r_s =-.42, p=.004; r_s=-.51, p<.001 respectively) and fathers (r_s=-.43, p=.004.; r_s=-.51, p<.001). These results were in line with our prediction however, contrary to expectations, no associations were identified between use of bedtime behaviours that encouraged autonomy and objectively assessed child sleep.

7.3.6.i. Are parental cognitions about their own and child's sleep along with practices relating to their own sleep predictive of the sleep-related practices they use with their child?

Hierarchical linear regression models were run to explore the predictive nature of the independent variables of parental (maternal and paternal) cognitions and sleep-related practices relevant to their own sleep (DBAS and SPAQ-A-P) and cognitions about child sleep (PCISQ) on the sleep-related practices parents employ with their child (SPAQ-C-P), as shown in Figure 10. Individual models were conducted on the same variables across mothers and fathers and are reported separately below.

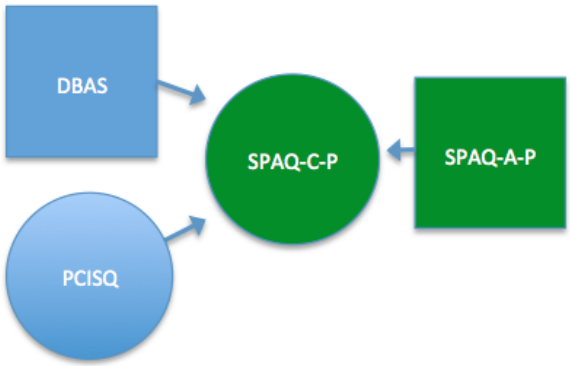

Figure 10. Illustration of research question 6.i.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices

7.3.6.i.a. Mothers

For mothers, in step 1 maternal cognitions about their own sleep (DBAS) were included but did not significantly predict maternal sleep-related practices in relation to their child's sleep, $F(1,44)=.042$, $p=.838$. However in step 2 maternal cognitions about their own sleep (DBAS) and own sleep-related practices (SPAQ-A-P) were included and significantly predicted maternal practices relating to child sleep, $F(2,43)=5.70$, $p=.006$, explaining 20.9% of the variance in maternal sleep-related practices concerning their child's sleep. In step 3 maternal cognitions about their own sleep (DBAS) and own sleep-related practices (SPAQ-A-P) and cognitions about their child sleep (PCISQ) were included and also significantly predicted maternal sleep-related practices employed with their child, $F(3,42)=3.82$, $p=.017$, explaining 21.4% of the variance in maternal sleep-related practices employed with their child. However, only mothers' own sleep-related practices (SPAQ-A-P) was found to be a significant predictor of maternal sleep-related practices employed with their child (SPAQ-C-P; see Table 47 for summary). Specifically, higher levels of poor maternal sleep-related behaviours employed in relation to their own sleep predicted higher levels of poorer sleep-related behaviours employed with their child.

Table 47. Summary of regression analysis variables to predict maternal practices relating to child sleep

		B	SE B	Beta	p
Step 1	Constant	37.20	4.22		
	Cognitions about own sleep (DBAS)	.19	.92	.031	.838
Step 2	Constant	15.20	7.56		
	Cognitions about own sleep (DBAS)	-.10	.83	-.016	.908
	Sleep-related practices (SPAQ-A-P)	**.37**	**.11**	**.46**	**.002**
Step 3	Constant	15.93	7.76		
	Cognitions about own sleep (DBAS)	.07	.90	-.01	.943
	Sleep-related practices (SPAQ-A-P)	**.38**	**.11**	**.47**	**.002**
	Parental cognitions about child sleep (PCISQ)	-.07	.13	-.08	.612

R^2 change = .001 for step 1, **Δ** R^2 = .208 for step 2, **Δ** R^2 = .005 for step 3

7.3.6.i.b. Fathers

For fathers, the hierarchical linear regression model using paternal cognitions about their own sleep (DBAS), sleep-related practices concerning their own sleep (SPAQ-A-P), and paternal cognitions relating to child sleep (PCISQ) to predict paternal sleep-related practices in relation to their child's sleep (SPAQ-C-P) was not significant, $F(3,44)=1.68$, $p=.187$. No significant predictors of paternal sleep-related practices relating to child sleep were found. See Table 48 for summary.

Table 48. Summary of regression analysis variables to predict paternal practices relating to child sleep

		B	SE B	Beta	p
Step 1	Constant	42.48	3.58		
	Cognitions about own sleep (DBAS)	-.79	.82	-.15	.341
Step 2	Constant	30.00	10.12		
	Cognitions about own sleep (DBAS)	-.76	.81	-.14	.353
	Sleep-related practices (SPAQ-A-P)	.19	.14	.20	.195
Step 3	Constant	23.36	10.90		
	Cognitions about own sleep (DBAS)	-1.37	.89	-.25	.113
	Sleep-related practices (SPAQ-A-P)	.21	.14	.22	.153
	Parental cognitions about child sleep (PCISQ)	.28	.18	.25	.139

7.3.6.ii. Are parental cognitions about their own sleep and practices relating to their own and their child's sleep predictive of the cognitions parents hold about their child's sleep?

Hierarchical linear regression models were run to explore the predictive contribution of maternal and paternal cognitions about their own sleep (DBAS), sleep-related practices relevant to their own (SPAQ-A-P) and their child's sleep (SPAQ-C-P) on parental cognitions about their child's sleep (PCISQ), as shown in Figure 11. Individual models were conducted on the same maternal and paternal variables and are reported separately below.

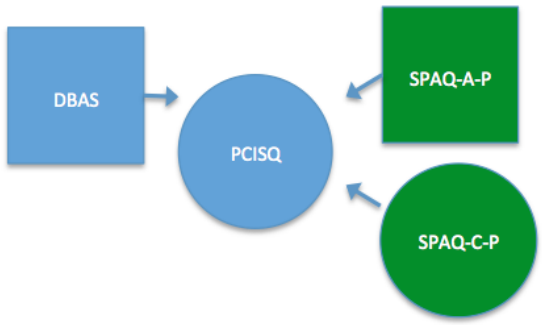

Figure 11. Illustration of research question 6.ii.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices.

7.3.6.ii.a. Mothers

For mothers, in step 1 maternal cognitions about their own sleep (DBAS) was included and significantly predicted maternal cognitions about child sleep (PCISQ), $F(1,44)=6.75$, $p=.013$. Explaining 13% of the variance in maternal cognitions about child sleep. In step 2 maternal cognitions about their own sleep (DBAS) and maternal sleep-related practices (SPAQ-A-P) were included and significantly predicted maternal cognitions about child sleep (PCISQ), $F(2,43)=3.93$, $p=.027$, explaining 16% of the variance in maternal cognitions about child sleep. In step 3 maternal cognitions about their own sleep (DBAS), maternal sleep-related practices (SPAQ-A-P) and maternal sleep-related practices relating to their child's sleep (SPAQ-C-P) to predict maternal cognitions about child sleep (PCISQ) was not significant, $F(3,42)=2.66$, $p=.060$. However, across all steps of the model maternal cognitions about their own sleep (DBAS) was the only significant positive predictor of maternal cognitions about child sleep (PCISQ). The summary for individual predictor variables is presented in Table 49. Specifically, higher levels of dysfunctional maternal attitudes or beliefs about their own sleep predicted higher levels of concerns or worries about their child's sleep.

Table 49. Summary of regression analysis variables to predict maternal cognitions about child sleep

		B	SE B	Beta	p
Step 1	Constant	18.95	4.43		
	Cognitions about own sleep (DBAS)	**2.51**	**0.97**	**.37**	**.013**
Step 2	Constant	10.96	8.82		
	Cognitions about own sleep (DBAS)	**2.41**	**0.97**	**.35**	**.017**
	Sleep-related practices (SPAQ-A-P)	0.14	0.13	.15	.301
Step 3	Constant	12.35	9.30		
	Cognitions about own sleep (DBAS)	**2.40**	**0.98**	**.35**	**.019**
	Sleep-related practices (SPAQ-A-P)	0.17	0.15	.19	.254
	Sleep-related practices relevant to child sleep (SPAQ-C-P)	-0.09	0.18	-.08	.612

R^2 change= .133 for step 1, **Δ** R^2 = .022 for step 2, **Δ** R^2 = .005 for step 3

7.3.6.ii.b. Fathers

For fathers, the model using paternal cognitions about their own sleep (DBAS), sleep-related practices relating to their own (SPAQ-A-P), and their child's sleep (SPAQ-C-P) to predict paternal cognitions about child sleep (PCISQ) was significant, $F(3,41)=4.59$, $p=.007$, explaining 25.2% of the variance in parental cognitions about child sleep. However paternal cognitions about their own sleep (DBAS) was the only significant positive predictor of paternal cognitions about their child's sleep (PCISQ). See Table 50 for the summary. Specifically, higher levels of dysfunctional paternal attitudes or beliefs about their own sleep predicted higher levels of concerns or worries about their child sleep.

Table 50. Summary of regression analysis variables to predict paternal cognitions about child sleep

		B	SE B	Beta	p
Step 1	Constant	19.92	2.93		
	Cognitions about own sleep (DBAS)	**2.22**	**.67**	**.45**	**.002**
Step 2	Constant	24.06	8.41		
	Cognitions about own sleep (DBAS)	**2.21**	**.67**	**.45**	**.002**
	Sleep-related practices relating to own sleep (SPAQ-A-P)	-.06	.12	-.07	.602
Step 3	Constant	18.34	9.12		
	Cognitions about own sleep (DBAS)	**2.35**	**.67**	**.48**	**.001**
	Sleep-related practices relating to own sleep (SPAQ-A-P)	-.10	.12	-.11	.415
	Sleep-related practices relating to child's sleep (SPAQ-C-P)	.19	.13	.21	.139

7.3.7. Are parental cognitions and practices relating to their own and their child's sleep predictive of the child's (i) parentally reported presence of a CSP and (ii) actigraphically assessed sleep?

Regressions were run to explore if parental cognitions and practices relating to their own (DBAS and SPAQ-A-P) and their child's sleep (PCISQ total score, SPAQ-C-P, and PIBBS subscales) were predictive of child sleep. Given that predictors of objectively and subjectively classified child sleep may differ, separate regressions were conducted with these independent variables and with the dependent variables of both subjective (parental report of CSP, BISQ item) and objective (sleep efficiency determined by actigraphy) assessed child sleep

7.3.7.i. Parentally reported presence of a CSP

Binary logistic regressions were run to explore if the independent variables of parental cognitions about their own and their child's sleep (DBAS and PCISQ), sleep-related practices concerning their own (SPAQ-A-P) and their child's sleep (SPAQ-C-P and PIBBS) were predictive of subjective parentally reported (mothers and fathers) perception of a CSP (Yes/No), as shown in Figure 12. Separate regression models were run on maternal and paternal variables and are individually reported below.

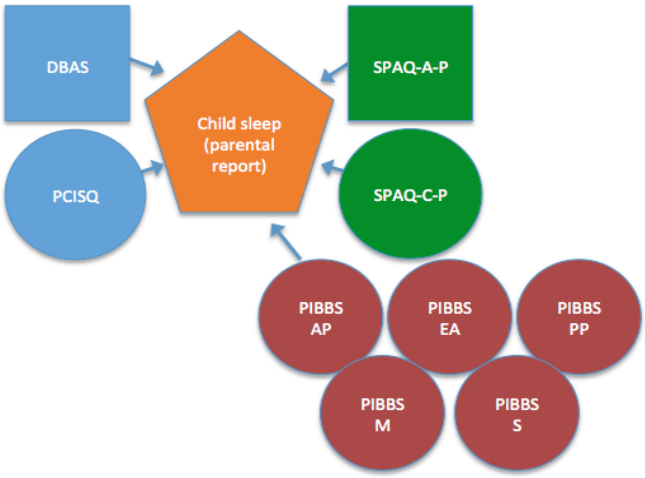

Figure 12. Illustration of research question 7.i.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours, Orange=Child sleep, Pentagon=Parental report

7.3.7.i.a. Maternal perception

The first binary regression to predict maternal perception of a CSP (Yes/No) was significant (x^2=28.98, p =.001, df=9), explaining 46.7% of the variance in maternal perception of a CSP. The summary is presented in Table 51. However maternal sleep-related practices relevant to their child's sleep (SPAQ-C-P) and active physical comforting settling methods (PIBBS subscale) were the only significant predictors. Specifically, and unexpectedly, increased maternal use of poor sleep-related practices relating to child sleep (represented by higher SPAQ-C-P scores) predicted mothers perceiving that their child did not have a CSP. While increased use of active physical comforting methods (higher scores on PIBBS subscale), predicted mothers reporting that their child had a CSP.

Table 51. Summary of binary logistic regression variables to predict maternal perception of a CSP

	B	SE B	Wald	p	Beta (exp)
Cognitions about own sleep (DBAS)	-0.17	0.92	0.03	.857	0.85
Parental cognitions about child sleep (PCISQ)	0.17	0.12	2.23	.136	1.19
Sleep-related practices (SPAQ-A-P)	-0.17	0.10	2.53	.112	0.85
Sleep-related practices relevant to child sleep (SPAQ-C-P)	**0.39**	**0.18**	**4.72**	**.030**	**1.47**
Settle by active physical comforting (PIBBS)	**-0.15**	**0.07**	**4.67**	**.031**	**0.86**
Settle by encourage autonomy (PIBBS)	-0.02	0.03	0.55	.459	0.98
Settle by movement (PIBBS)	-0.01	0.02	0.16	.688	0.99
Settle by passive physical comforting (PIBBS)	-0.09	0.05	3.05	.081	0.92
Settle by social comforting (PIBBS)	-0.02	0.04	0.17	.683	0.98

7.3.7.i.b. Paternal perception

The binary logistic regression model to predict paternal perception of a CSP (Yes/No) was significant (x^2=17.82, p=.037, df=9), explaining 32.7% of the variance in paternal perception of a CSP. See Table 52 for summary. However, paternal cognitions about child sleep (PCISQ) and paternal physical comforting (PIBBS subscale) were the only significant predictors. Specifically, increased levels of concerns about child sleep (represented by higher paternal PCISQ scores) and increased use of active physical comforting methods (higher PIBBS subscale score) predicted fathers classifying their child as having a CSP.

Table 52. Summary of binary logistic regression variables to predict paternal perception of a CSP

	B	SE B	Wald	p	Exp (B)
Cognitions about own sleep (DBAS)	0.37	0.39	0.93	.336	1.45
Parental cognitions about child sleep (PCISQ)	**-0.25**	**0.10**	**5.99**	**.014**	**0.78**
Sleep-related practices (SPAQ-A-P)	-0.13	0.08	2.30	.126	0.88
Sleep-related practices relevant to child sleep (SPAQ-C-P)	0.10	0.08	1.65	.198	1.10
Settle by active physical comforting (PIBBS)	**-0.07**	**0.03**	**4.55**	**.033**	**0.93**
Settle by encourage autonomy (PIBBS)	0.02	0.02	0.84	.361	1.02
Settle by movement (PIBBS)	0.00	0.02	0.00	.990	1.00
Settle by passive physical comforting (PIBBS)	0.01	0.02	0.15	.696	1.01
Settle by social comforting (PIBBS)	0.00	0.03	0.00	.998	1.00

7.3.7.ii. Actigraphically assessed child sleep

A hierarchical linear regression model using parental cognitions (both mothers and fathers) about their own and their child's sleep (DBAS and PCISQ), sleep-related practices relevant to their own (SPAQ-A-P) and their child's sleep (SPAQ-C-P and PIBBS) to predict objectively measured child sleep (sleep efficiency determined by actigraphy), as shown in Figure 13, was not significant, F(18,24)=.742, p=.739. Only paternal active physical comforting settling

methods (PIBBS) was found to be a significant predictor of objectively assessed child sleep. The summary is provided in Table 53. Specifically, lower levels of paternal endorsement of active physical comforting methods to settle their child, unexpectedly, predicted improved child sleep efficiency.

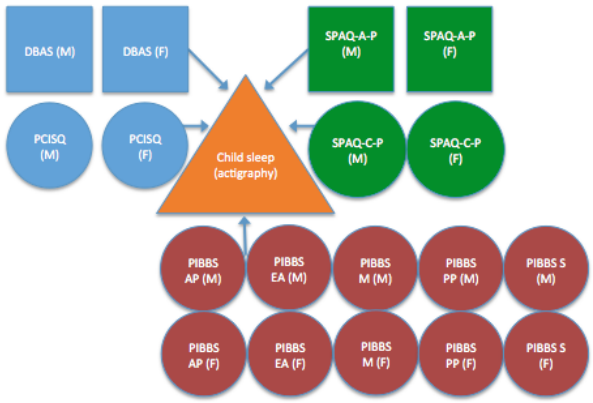

Figure 13. Illustration of research question 7.ii.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours, Orange=Child sleep, Triangle=Actigraphically assessed. M=Mothers, F=Fathers

Table 53. Summary of regression analysis variables to predict objectively measured child sleep

		B	Std. Error	Beta	p
Step 1	(Constant)	76.25	7.77		
	Maternal cognitions about own sleep (DBAS)	0.14	1.19	.02	.908
	Paternal cognitions about own sleep (DBAS)	-1.06	1.11	-.17	.343
	Maternal cognitions about child sleep (PCISQ)	0.18	0.17	.18	.283
	Paternal cognitions about child sleep (PCISQ)	-0.05	0.22	-.04	.808
Step 2	(Constant)	93.22	19.04		
	Maternal cognitions about own sleep (DBAS)	0.19	1.26	.03	.882
	Paternal cognitions about own sleep (DBAS)	-1.45	1.23	-.24	.244
	Maternal cognitions about child sleep (PCISQ)	0.18	0.18	.18	.327
	Paternal cognitions about child sleep (PCISQ)	-0.04	0.24	-.03	.864
	Maternal sleep-related practices (SPAQ-A-P)	0.05	0.18	.06	.763
	Paternal sleep-related practices (SPAQ-A-P)	-0.14	0.19	-.13	.455
	Maternal sleep-related practices relating to child sleep (SPAQ-C-P)	-0.24	0.25	-.19	.334
	Paternal sleep-related practices relating to child sleep (SPAQ-C-P)	0.02	0.23	.02	.924
Step 3	(Constant)	93.39	24.05		
	Maternal cognitions about own sleep (DBAS)	0.37	1.46	.05	.802
	Paternal cognitions about own sleep (DBAS)	-1.10	1.29	-.18	.400
	Maternal cognitions about child sleep (PCISQ)	0.24	0.24	.24	.328
	Paternal cognitions about child sleep (PCISQ)	-0.13	0.27	-.10	.634
	Maternal sleep-related practices (SPAQ-A-P)	0.16	0.21	.16	.444
	Paternal sleep-related practices (SPAQ-A-P)	-0.32	0.25	-.30	.211
	Maternal sleep-related practices relating to child sleep (SPAQ-C-P)	-0.27	0.30	-.21	.373
	Paternal sleep-related practices relating to child sleep (SPAQ-C-P)	0.09	0.27	.08	.741

	B	Std. Error	Beta	p
Maternal settle by active physical comforting (PIBBS)	0.02	0.13	.05	.878
Maternal settle by encourage autonomy (PIBBS)	-0.13	0.11	-.41	.255
Maternal settle by movement (PIBBS)	0.02	0.08	.08	.779
Maternal settle by passive physical comforting (PIBBS)	0.01	0.09	.02	.919
Maternal settle by social comforting (PIBBS)	0.02	0.10	.06	.814
Paternal settle by active physical comforting (PIBBS)	**-0.28**	**0.13**	**-.71**	**.048**
Paternal settle by encourage autonomy (PIBBS)	0.04	0.13	.10	.769
Paternal settle by movement (PIBBS)	0.04	0.10	.12	.683
Paternal settle by passive physical comforting (PIBBS)	0.07	0.08	.22	.339
Paternal settle by social comforting (PIBBS)	0.19	0.11	.52	.099

7.3.8. Do parental mental health, parenting competence, child temperament, parental sleep-related cognitions and practices (relating to their own and their child's sleep) predict the child's (i) parentally reported and (ii) actigraphically assessed sleep?

7.3.8.i. Parentally reported child sleep

Two binary logistic regressions were run, the first explored maternal variables as predictors and maternal perception of a CSP as the outcome variable, see Figure 14. The second, explored the same predictors and outcome variables but using paternal variables. Both binary logistic regressions were also run using child variables (age and temperament), parental variables (mental health-GHQ, parenting efficacy-PSOC), parental cognitions about their own and their child's sleep (DBAS and PCISQ), and parental sleep-related practices relating to child sleep (SPAQ-C-P and PIBBS subscales) to predict maternal and paternal perception of a CSP as outcome variables. Both binary logistic regressions were not significant and no predictor variables were identified and so are not presented.

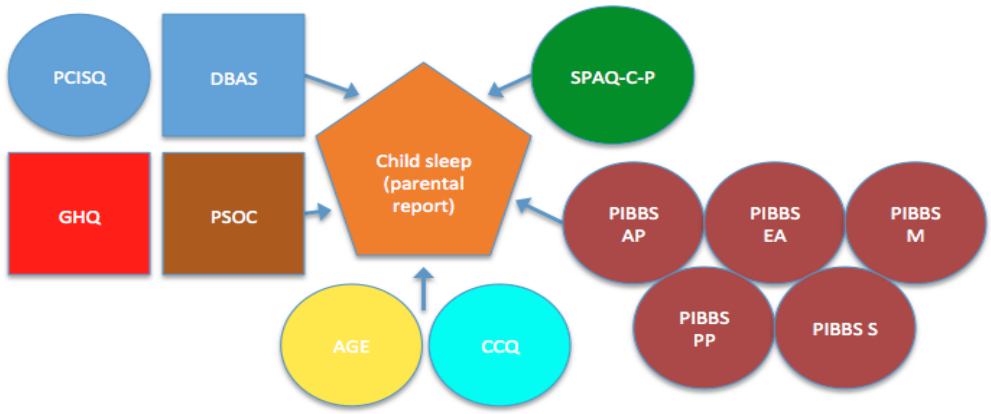

Figure 14. Illustration of research question 8.i.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours, Red(square)=Parental mental health, Brown(square)=Sense of parenting competence, Turquoise(round)=Child temperament, Yellow(round)= Child age. Orange=Child sleep, Pentagon=Parental report

7.3.8.ii. Actigraphically assessed child sleep

A hierarchical linear regression model using child variables (age and temperament), parental variables (mental health-GHQ and parenting efficacy-PSOC), parental cognitions about their own and their child's sleep (DBAS and PCISQ), and parental sleep-related practices relevant to their child's sleep (SPAQ-C-P and PIBBS subscales) to predict objectively measured child sleep (sleep efficiency determined by actigraphy), as shown in Figure 15, was not significant, $F(23,41)=.629$, $p= .854$. No predictor variables were identified. See Table 54 for the summary analysis of regression variables.

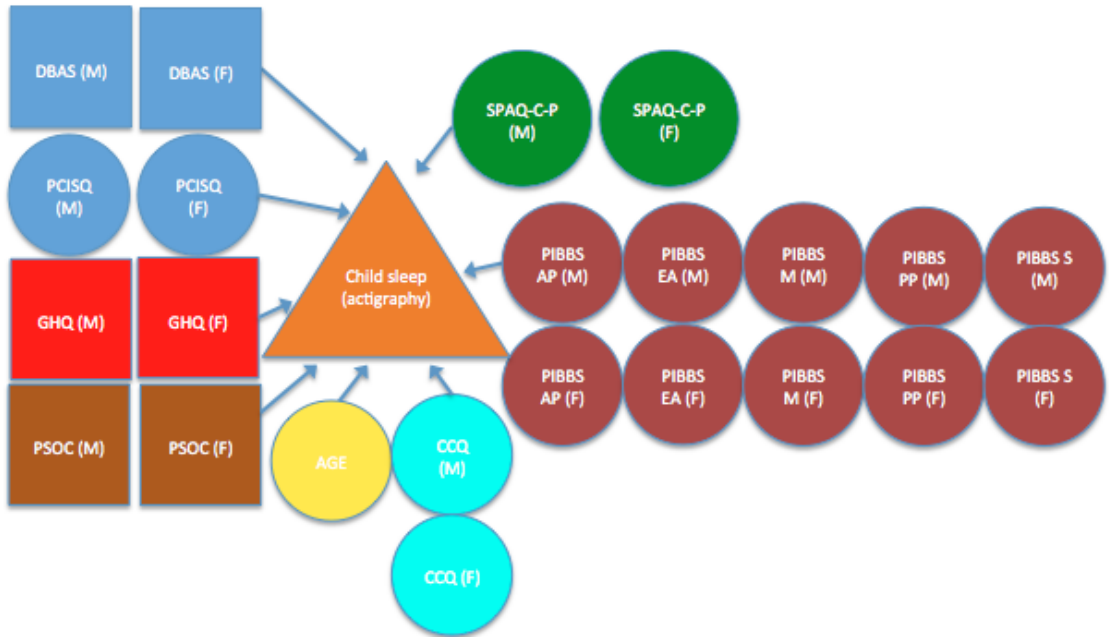

Figure 15. Illustration of research question 8.ii.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours, Red(square)=Parental mental health, Brown(square)=Sense of parenting competence, Turquoise(round)=Child temperament, Yellow(round)= Child age. Orange=Child sleep, Triangle=Actigraphically assessed. M=Mother, F=Father.

Table 54. Summary of regression analysis variables to predict objectively measured child sleep

		B	Std. Error	Beta	p
Step 1	(Constant)	68.05	11.81		
	Child age (months)	0.27	0.34	.13	.430
	Maternal child temperament (CCQ)	0.14	0.11	.25	.206
	Paternal child temperament (CCQ)	-0.10	0.10	-.19	.333
Step 2	(Constant)	88.70	28.60		
	Child age (months)	0.20	0.41	.10	.626
	Maternal child temperament (CCQ)	0.08	0.13	.14	.572
	Paternal child temperament (CCQ)	-0.10	0.12	-.20	.402
	Maternal mental health (GHQ)	1.22	5.10	.05	.813
	Paternal mental health (GHQ)	-3.38	6.95	-.11	.630
	Maternal parenting (PSOC)	-0.16	0.24	-.15	.513
	Paternal parenting (PSOC)	0.00	0.17	.00	.993
Step 3	(Constant)	88.53	30.91		
	Child age (months)	0.33	0.45	.16	.462
	Maternal child temperament (CCQ)	0.02	0.17	.04	.895
	Paternal child temperament (CCQ)	-0.09	0.14	-.18	.518
	Maternal mental health (GHQ)	-1.53	5.84	-.06	.795
	Paternal mental health (GHQ)	-1.93	7.59	-.06	.801
	Maternal parenting (PSOC)	-0.13	0.27	-.13	.629
	Paternal parenting (PSOC)	-0.03	0.21	-.04	.879
	Maternal cognitions about own sleep (DBAS)	0.19	1.47	.03	.897
	Paternal about own sleep (DBAS)	-0.93	1.44	-.15	.525
	Maternal cognitions about child sleep (PCISQ)	0.23	0.25	.23	.364

		B	Std. Error	Beta	p
	Paternal cognitions about child sleep (PCISQ)	0.00	0.28	.00	.996
Step 4	(Constant)	97.70	44.74		
	Child age (months)	1.14	0.67	.55	.106
	Maternal child temperament (CCQ)	0.08	0.20	.16	.685
	Paternal child temperament (CCQ)	-0.12	0.16	-.23	.460
	Maternal mental health (GHQ)	-11.03	8.00	-.45	.185
	Paternal mental health (GHQ)	9.59	10.54	.31	.375
	Maternal parenting (PSOC)	-0.12	0.35	-.10	.767
	Paternal parenting (PSOC)	-0.24	0.25	-.27	.363
	Maternal cognitions about own sleep (DBAS)	1.20	1.95	.17	.544
	Paternal about own sleep (DBAS)	-2.44	1.80	-.39	.193
	Maternal cognitions about child sleep (PCISQ)	0.31	0.32	.32	.343
	Paternal cognitions about child sleep (PCISQ)	-0.10	0.34	-.08	.785
	Maternal sleep-related practices relevant to child sleep (SPAQ-C-P)	-0.17	0.32	-.14	.594
	Paternal sleep-related practices relevant to child sleep (SPAQ-C-P)	-0.22	0.34	-.19	.525
	Maternal settle by active physical comforting (PIBBS)	0.00	0.15	.01	.969
	Maternal settle by encourage autonomy (PIBBS)	-0.08	0.13	-.27	.540
	Maternal settle by movement (PIBBS)	0.13	0.09	.46	.153
	Maternal settle by passive physical comforting (PIBBS)	-0.11	0.13	-.30	.384
	Maternal settle by social comforting (PIBBS)	0.00	0.11	.00	.993
	Paternal settle by active physical comforting (PIBBS)	-0.29	0.14	-.71	.058
	Paternal settle by encourage autonomy (PIBBS)	-0.07	0.16	-.16	.690
	Paternal settle by movement (PIBBS)	0.05	0.12	.15	.659
	Paternal settle by passive physical comforting (PIBBS)	0.09	0.09	.27	.333
	Paternal settle by social comforting (PIBBS)	0.25	0.13	.70	.071

7.3.9. Does congruence/discordance between mother's and father's cognitions (about their own and their child's sleep) and practices (for their own and their child's sleep) predict the child's (i) parentally reported and (ii) actigraphically assessed sleep?

7.3.9.i. Primary night-time caregiver (PNCG) perception of a CSP

A binary logistic model which used parental agreement across parental cognitions (DBAS and PCISQ) and sleep-related practices concerning their own and their child's sleep, as well as bedtime behaviours used with their child (SPAQ-A-P, SPAQ-C-P, and PIBBS) to predict primary night-time caregiver (PNCG) perception of a CSP (Yes/No), as shown in Figure 16, was not significant (x^2=2.13, p =.831, df=5). No predictor variables were identified. The summary is presented in Table 55.

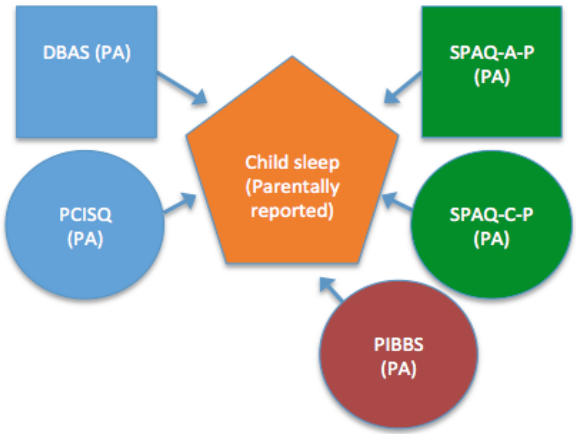

Figure 16. Illustration of research question 9.i.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours. PA=Parental agreement. Orange=Child sleep, Pentagon=Parental report

Table 55. Summary of regression analysis variables to predict PNCG perception of a CSP

	B	SE B	Wald	p	Beta (exp)
Cognitions relating to own sleep (DBAS)	-0.24	0.19	1.56	.212	0.79
Parental cognitions about child sleep (PCISQ)	-0.01	0.20	0.00	.955	0.99
Sleep-related practices (SPAQ-A-P)	0.07	0.13	0.29	.589	1.07
Sleep-related practices with child (SPAQ-C-P)	-0.10	0.14	0.53	.466	0.90
Bedtime behaviours to settle child (PIBBS)	0.05	0.15	0.10	.747	1.05

7.3.9.ii. Actigraphically assessed child sleep

A hierarchical linear regression model using parental agreement (PA) across cognitions (DBAS and PCISQ) and sleep-related practices relevant to their own and their child's sleep (SPAQ-A-P, SPAQ-C-P, and PIBBS total) to predict objectively assessed child's sleep (sleep efficiency determined by actigraphy), as shown in Figure 17, was not significant, $F(5,41)=.887$, $p=.500$. No significant predictors were identified. See Table 56 for summary.

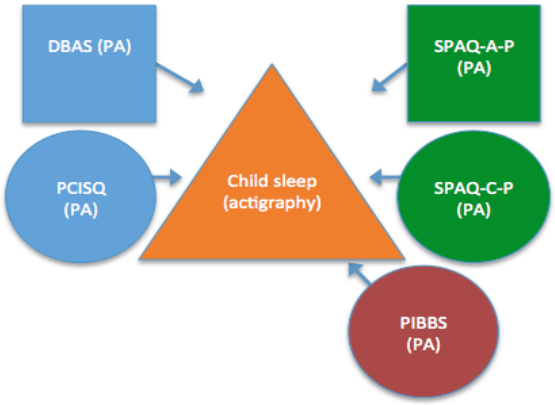

Figure 17. Illustration of research question 9.ii.
Key to Image: Circle=Relating to child, Square=Relating to parent, Blue (circle or square as appropriate)=Cognitions, Green (circle or square as appropriate)=Practices, Maroon(circle)= bedtime behaviours. PA=Parental agreement. Orange=Child sleep, Triangle=Actigraphically assessed

Table 56. Summary of regression analysis variables to predict objectively measured child sleep

		B	Std. Error	Beta	p
Step 1	(Constant)	80.07	9.29		
	PA cognitions own sleep (DBAS)	0.73	0.59	0.19	.219
	PA cognitions relating to child sleep (PCISQ)	-0.93	0.59	-0.24	.125
Step 2	(Constant)	83.42	14.32		
	PA cognitions own sleep (DBAS)	0.87	0.65	0.23	.187
	PA cognitions relating to child sleep (PCISQ)	-0.94	0.62	-0.24	.137
	PA sleep-related practices (SPAQ-A-P)	-0.38	0.43	-0.15	.387
	PA sleep-related practices with child (SPAQ-C-P)	0.26	0.54	0.09	.626
	PA Bedtime behaviours to settle child (PIBBS)	-0.16	0.52	-0.05	.760

7.4. Chapter summary

This chapter has presented results relevant to the overall aim of this study, which was to explore a range of maternal and paternal factors, their relationship with each other, as well as how these factors are related to child sleep (both objectively and subjectively assessed). The chapter began by presenting descriptive details of a range of parent variables and child variables, which included parental cognitions, knowledge, and practices relating to parents own sleep and their child's sleep. Where appropriate, differences between mothers and fathers were highlighted. The significance of parental dyadic agreement across key variables was also examined. The sleep of the sample was explored and differences in the frequency of CSPs based on parental report and research definition were highlighted. The results of statistical analyses performed on the data to address the individual research questions were presented and the subsequent chapter of this thesis will offer a discussion of these findings in relation to existing literature.

Chapter 8

Study two: Discussion

This chapter offers a discussion of study two findings. This will begin with a brief overview of the results, followed by a consideration of these results in the context of previous research. Limitations pertinent to the study and suggestions for future research will also be provided.

8.1. Summary of findings

Novel findings included that, for mothers and fathers, higher levels of dysfunctional cognitions about their own sleep were associated with and predictive of increased levels of cognitions which reflected worries or concerns about their child's sleep. However, the cognitions held about child sleep differed between mothers and fathers. Parental involvement in bedtime behaviours was associated with parent-reported child night-wakes for mothers but not fathers. Conversely, parental endorsement of bedtime behaviours that encouraged child autonomy were, for both mothers and fathers, negatively associated with the number of child night-wakings.

Poorer parental knowledge about child sleep in both mothers and fathers was associated with the use of poorer parental sleep-related practices with their child. Different patterns of parental variables between mothers and fathers were

significant predictors of their perceptions of a child sleeplessness problem (CSP). For mothers, use of active physical comforting and the sleep-related practices used with their child and for fathers also use of active physical comforting alongside overall concerns about their child's sleep. Parental agreement across a range of parental variables, including cognitions (about their own and their child's sleep) and sleep-related practices (for their own and their child's sleep) were not significant predictors of parent-reported or objectively assessed child sleep. The remainder of this chapter will present a discussion of these findings in relation to the existing literature on the topic.

8.2. Sleep of the sample

Children's sleep behaviour was comparable to previously reported data for similar age groups (0-3 years and 6-30 months respectively) based on a large meta-analysis and UK sample (Galland et al., 2012; O'Connor et al., 2007). The overall rate of CSPs in the current sample was comparable with the 10-35% prevalence rates reported in previous studies originating from Western samples (Byars et al., 2012; Sadeh et al., 2009; Morrell, 1999; Armstrong et al., 1994; Johnson, 1991).

Reported rates of CSPs vary from study to study and are likely impacted by how child sleeplessness is defined. Overall, levels of parentally reported CSPs in the current study are higher than the 9.6-10.4% reported for American 6-36 month olds (Byars et al., 2012) and the 10-21.2% reported for 8-24 month old Australian children (Wake et al., 2006). However, as noted in study one, a potential explanation for the high levels of parentally reported CSPs may be that more parents who held concerns about their child's sleep or perceived their child suffered from a CSP may have participated. Although, the presence of parentally reported CSPs in the current study was lower than has been previously reported at 93.91% in Israel (child's sleep was either a very serious or small problem), and 35.3% in the UK respectively (Sadeh, 2004; Morrell, 1999).

In the current study, fewer mothers (23.9%) than fathers (32.6%) reported CSPs, however, comparisons are limited as previous studies have not included rates based on both parents' reports. When the research definition was applied,

prevalence rates reported by mothers (17.4%) and fathers (19.6%) were comparable to previous samples based on maternal report (17%) (Morrell, 1999), but somewhat higher than the 10% reported in an American study using a similar measure (Byars et al., 2012).

The self-reported adult sleep behaviour of parents in the current sample was comparable to previous UK samples across aspects such as bedtime, get up time, and sleep duration (Leng et al., 2014; Groeger, Zijlstra, & Dijk, 2004). The proportion of good sleepers was also comparable to participants who reported having no or minimal sleep problems in previous studies (Leng et al., 2014; Groeger et al., 2004). Global PSQI scores were slightly higher in the current study than have previously been reported, but the mean remained under the cut-off score, which distinguishes between good and poor sleepers (Buysse et al., 1989). When the sample was divided into mothers and fathers, the mean global PSQI scores were lower than has previously been reported in mothers and fathers of typically developing children (Meltzer, 2008).

8.3. Parental cognitions and child sleep

Previous literature has highlighted a link between certain types of parental cognitions about their child's sleep, specifically those which reflect difficulties in setting limits on child behaviour and the perception of high levels of infant distress upon awakening, with poorer child sleep (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Tikotzky & Sadeh, 2009; Johnson & McMahon, 2008; Sadeh et al., 2007; Morrell & Steele, 2003; Morrell, 1999).

The current study adds to the existing body of literature and highlights a new variable, dysfunctional parental beliefs and attitudes about their own sleep, which may also need to be considered when exploring parental cognitions about child sleep and their influence on child sleep. In full support of the prediction, across mothers and fathers, dysfunctional cognitions about their own sleep were associated with and predictive of overall levels of concerns and worries about their child's sleep (but this prediction was only partially supported following Bonferroni correction with relationship for fathers, but not mothers remaining significant). However, what is not clear from the current study is the direction of the relationship. One possible explanation is that parents who hold

dysfunctional cognitions about their own sleep are predisposed or more vulnerable to developing increased levels of concerns or worries about their child's sleep, perhaps due to their heightened focus on negative aspects of sleep. However, while parental cognitions about their own sleep may drive their cognitions about their child's sleep, this relationship could also occur in reverse.

The importance of acknowledging cognitive and behavioural aspects of child sleep, as highlighted in the current study, mirrors the adult insomnia literature where cognitions are now understood to be a key component to understanding adult insomnia (Harvey, 2002; Lichstein & Rosenthal, 1980; Morin et al., 1993). This cognitive-behavioural conceptualisation of adult insomnia is reflected in approaches to intervention, with the most common and successful treatment being Cognitive Behavioural Therapy for Insomnia (CBT-I), which seeks to identify and modify both cognitive and behavioural aspects (Swift et al., 2012; Morgenthaler et al., 2006a; Morin et al., 2006; Morin et al., 1999). CSP interventions may benefit from addressing both cognitive and behavioural aspects more explicitly (Tikotzky & Sadeh, 2010).

Currently, most CSPs are considered to be behavioural in nature. This conceptualisation is reflected in the most common and successful interventions being behaviourally based (Blunden, 2011; Wilson et al., 2010; Mindell et al., 2006). These interventions aim to alter the behaviours (of parent and child), which cause and/or perpetuate the CSP. However, the way parents behave in relation to their child's sleep may, at least partly, be impacted by the cognitions held and way in which child sleep is interpreted (Morrell, 1999). Empirical evidence has highlighted the importance of both cognitions and behaviours in child sleep, suggesting that parental bedtime behaviours mediate the relationship between parental cognitions about child sleep and the child's actual sleep (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Johnson & McMahon, 2008).

Addressing any dysfunctional parental cognitions (about their own and/or child sleep), such as by correcting any erroneous beliefs, may contribute to changes (and the maintenance of any changes) in parental behaviours used with their child during the sleep period. Alternatively, addressing parental cognitions

about child sleep could facilitate improved parental engagement with behavioural interventions (Mindell et al., 2006). For example, in many cases behavioural interventions require parents to change their behaviours, and the recommended behaviours may be at odds with parental beliefs and seen as inappropriate (Sadeh, 2005). In these cases, parental cognitions could act as negative reinforcement for parents not changing their sleep-related behaviours with their child (Morrell, 1999). A preventative approach delivered early in parenthood, which addresses the potential negative influence of parental cognitions on child sleep, could be clinically beneficial.

In the current study, an unexpected result was the positive association between maternal concerns about setting limits or resisting child demands and increased child sleep efficiency. One possible explanation is that the relevant setting limits subscale from the Parental Cognitions about Infant Sleep Questionnaire (PCISQ), which was used in the current study, does not distinguish between mothers who struggle to set limits on their child's behaviours and those who have no desire to do so. Many of the PCISQ setting limits items appear to relate not just to child sleep but also child crying, and some mothers may not wish to resist their child's demands which manifest as crying. This explanation is supported by evidence which suggests that the main reservations parents report about behavioural intervention methods is fear of distressing their child and not wanting or struggling to resist child crying (Mindell et al., 2015; Blunden & Baills, 2013; Tse & Hall, 2007). If mothers respond swiftly to re-settling their child after a night-waking and thereby facilitate their return to sleep, this may at least in the short-term, result in the child having improved sleep efficiency in comparison to children whose parents leave the child to re-settle themselves. Therefore, the PCISQ limit setting subscale may differ from its intended purpose to assess parental feelings towards resisting child demands, and instead reflect how a parent chooses to respond to their child's settling difficulties or night-wakings.

8.4. Differences between mothers' and fathers' cognitions

Similar to previous studies, differences between mothers and fathers were identified in the cognitions held about child sleep, which reflected different areas of concern (Tikotzky et al., 2010; Sadeh et al., 2007). In the current study,

mothers, when compared to fathers reported more cognitions which reflected feeling challenged by setting limits on their child's behaviour and resisting their child's demands. On the other hand, fathers, when compared to mothers reported experiencing higher levels of cognitions reflecting feelings of anger towards their child's demands. The specific types of cognitions parents hold about child sleep appears to differ between the current and previous studies. Previous studies that have also used the PCISQ identified mothers, more so than fathers, experienced cognitions which reflected feelings of anger towards their child's demands and concerns surrounding child overnight safety (Sadeh et al., 2007). When the Infant Sleep Vignette Interpretation Scale (ISVIS) has been used, previous studies have also found that mothers, when compared to fathers, felt more strongly that infants experience high levels of distress upon awakening and require parental assistance to re-settle (Tikotzky et al., 2010; Sadeh et al., 2007). One the other hand, fathers, when compared to mothers, more strongly endorsed the belief that parental involvement in child sleep should be limited (Sadeh et al., 2007).

In the current study, mothers and fathers dysfunctional cognitions about their own sleep were found to be associated with cognitions which reflected different areas of concern about their child's sleep. Dysfunctional maternal cognitions about their own sleep were related to concerns about their child's safety overnight, whereas dysfunctional paternal cognitions about their own sleep were related to feelings of anger towards their child's demands.

A potential explanation for the differing pattern of parental cognitions identified in the current study may be that any differences do not necessarily reflect differences between parents but could be accounted for by who is the child's primary night-time caregiver (PNCG). Even though fathers are increasingly involved in child care-giving, mothers continue to be primary care-givers to children (Tikotzky et al., 2010; Cabrera et al., 2000). This was the case in the current study where the majority of PNCG were mothers. As more frequent PNCGs, mothers may simply have had more opportunities to set limits on their child's behaviours. Fathers, who were less commonly the child's PNCG in the current study, may have had less opportunity to deal with their child's demands than mothers and consequently felt more frustration and less tolerance of their

child's demands, resulting in increased feelings of anger towards their child. It is not clear the proportion of PNCGs who were mothers or fathers in previous studies and so it is not possible to compare samples in this respect meaning this explanation remains speculative.

8.5. Parental bedtime behaviours and sleep-related practices

A novel finding, in partial support of the prediction, was that maternal sleep-related practices concerning their own sleep were associated with and predictive of sleep-related practices employed with their child, however this was not the case for fathers (this partial support for the prediction remained significant after the Bonferroni correction was applied). This suggests that mothers' own sleep behaviour, whether positive or negative in terms of how conducive it was for sleep, was reflected in the behaviours they used with their child. As has previously been mentioned, it is not clear whether the relationship reflects a difference between mothers and fathers or whether it depends on who is the child's PNCG. Nevertheless, the current results suggest that it may be beneficial to consider parents' own sleep-related practices as part of standard antenatal care and, if necessary, educate parents about the link between parental bedtime behaviours and child sleep.

In line with previous literature (Mindell et al., 2010a; Touchette et al., 2005; Morrell & Cortina-Borja, 2002; Anders et al., 1992; Adair et al., 1991) and in partial support of the predictions, current findings demonstrate an associative link between poorer child sleep and a) increased levels of maternal involvement in bedtime behaviours (but not paternal involvement), although this was no longer significant when the Bonferroni correction was applied; and b) reduced levels of encouraging infant autonomy in both mothers and fathers (support for this prediction remained significant for mothers and fathers when the Bonferroni correction was applied, but only when the encourage autonomy with added item subscale was applied). In the current study, the association between increased parental endorsement of bedtime behaviours that encourage autonomy in their child and reduced number of parental-report child night-wakings were the more robust when the supplementary item ('putting the child into bed and leaving them to settle themselves') was included. As highlighted in section 2.2 the 60.9% of unexplained variance in the original PIBBS may partly be the result of

the lack of an item referring to this type of behaviour in the original scale, which is arguably the most explicit way a parent can encourage autonomy in their child, may mean that the Parental Interactive Bedtime Behaviour Scale (PIBBS) under-represents parental endorsement of these types of behaviours. Any future measure of parental bedtime behaviours or adaptations of the PIBBS should unequivocally include an item that relates to putting a child into bed and leaving them to settle themselves, which could be considered the clearest example of encouraging autonomy and currently is conspicuous by its absence in the PIBBS. Future research should accurately reflect the full range of different ways in which parents may seek to encourage autonomy and independence in their child's sleep.

Further, the PIBBS only provides an illustration of how frequently parents use specific behaviours to settle their child to sleep. However, other sleep-related practices and aspects, such as sleep routine, sleep environment, and sleep hygiene habits are not assessed by this measure. This is an omission, as previous studies have identified links between aspects such as positive routines and good sleep hygiene with better child sleep (Mindell et al., 2009a). In the current study, the Sleep Practices and Attitudes Questionnaire for parental practices in relation to child sleep (SPAQ-C-P) was adapted as a means by which to address this gap and provide an assessment of parental sleep-related practices used with their child, outside of the settling and soothing strategies employed. Although, increased use of active physical settling methods was most strongly associated with and predictive of child sleep and associations between SPAQ-C-P and child sleep were not as would have been expected; for example, poorer maternal sleep-related practices actually predicted that mothers did not perceive their child to have a CSP. It may be that maternal perceptions of CSPs are not purely based on aspects of child sleep or that as the SPAQ-C-P was adapted for use in this study it may not have adequately assessed the intended constructs. Alternatively, mothers may not possess adequate knowledge about child sleep to identify problematic child sleep or be aware of the types of sleep-related practices that are conducive or disruptive, to developing healthy child sleep. Therefore, it would be relevant for future studies to consider not just parental settling strategies but also broader sleep-related

practices used with their child, and to develop a method to reliably assess these aspects which have previously been neglected.

8.6. Parental cognitions, bedtime behaviours, and child sleep

Unlike previous studies, no consistent evidence was found to support the prediction that higher levels of parental cognitions reflecting difficulties setting limits on and resisting their child's behaviour would be associated with poorer child sleep (Tikotzky et al., 2010; Sadeh et al., 2007). A potential explanation for this disparity is that when compared to the current sample, previous studies have included children with a younger lower-age limit and also a broader overall age range of 4.5-30 months (Tikotzky et al., 2010) and 5-29 months (Sadeh et al., 2007). It is possible that parental cognitions change over the course of development with certain types of cognitions being more or less of a concern for parents at different child ages. Support for this idea is provided by previous studies, which appear to suggest that different types of parental cognitions about child sleep are variously associated with child sleep outcomes at different child ages (Tikotzky & Sadeh, 2009). It may be that parents of younger children hold higher levels of concerns relating to setting limits. Therefore, differences in the age ranges used across different studies may account for disparities in results around 'setting limits' cognitions and child sleep.

An alternative explanation for no identified link between parental cognitions about setting limits and poorer child sleep in the current study is that parental bedtime behaviours have the most direct route to child sleep, and act as a mediator between the cognitions parents hold and child sleep (Tikotzky & Shaashua, 2012; Sadeh et al., 2010). In line with previous studies, the current results support this proposed pathway, as increased use of active physical bedtime behaviours by both mothers and fathers were predictors of parentally reported CSPs (Mindell et al., 2010a; Touchette et al., 2005; Morrell, & Cortina-Borja, 2002). The importance of considering both parents is highlighted in the current study, by the fact that the overall pattern of predictors of parentally reported CSPs differed between mothers and fathers.

A regression model, which incorporated a range of parental and child variables was not significant, nor were there any significant predictors. This was

surprising given that the variables included had previously been linked to child sleep. These variables included: child age and temperament; parental mental health and parenting efficacy; parental cognitions about their own and their child's sleep; and parental sleep-related practices and bedtime behaviours with their child. However, the current study used an opportunistic general population sample of a fairly small size, and did not include parents or children with any specific sleep-disturbance criteria. Any effects are likely to be more prominent in children with clinically diagnosed CSPs or parents with their own sleep or mental health issues. Therefore, it is possible that due to the current sample, any associations were not evident or that the sample did not generate sufficient statistical power to identify any small effects. Future studies could include children with and without clinically diagnosed CSPs, and parents who have clinically diagnosed conditions such as insomnia or depression, to explore whether results differ between such groups.

8.7. Parental knowledge

As predicted, poorer parental knowledge about child sleep was associated with both the use of poorer sleep-related practices and increased use of active physical comforting methods with their child, for both mothers and fathers (this prediction was only partially supported when the Bonferroni correction was applied; for mothers there was a relationship between their knowledge and their use of active physical comforting methods and the sleep related practices they used with their child, but for fathers their knowledge was only significantly related to the sleep-related practices they used with their child). This is in line with previous research, which has demonstrated that improved parental knowledge about child sleep is associated with the use of more positive sleep-related practices in relation to child sleep (McDowall et al., 2016). In the current study and previous work, increased parental presence or involvement in bedtime behaviours has been linked to poorer child sleep (Mindell et al., 2009a; Tikotzky & Sadeh, 2009; Morrell & Cortina-Borja, 2002). Therefore, current results highlight the potential importance of educating parents about how the sleep-related practices and bedtime behaviours they use with their child may be linked with child sleep. Improving parents' knowledge about child sleep may include educating parents about the possible impact of parental involvement in settling methods. In turn, this may change parents' bedtime behaviours and

improve child sleep by encouraging them to develop the ability to self-soothe. Empirical evidence has also highlighted that improving parental knowledge through education can lead to improvements in child sleep (Bryanton, Beck, & Montelpare, 2013).

8.8. Parental agreement

Within each parental dyad the degree of congruence between mothers' and fathers' cognitions about their own and their child's sleep were broadly similar (67% and 65% respectively) and of a comparable agreement rate to the practices relating to their own sleep (64%). Levels of parental agreement were marginally higher (70%) for bedtime behaviours used to settle children to sleep and notably higher (78%) for parental sleep-related practices with their child. A potential explanation for these differences in parental agreement level is that parents actively discuss and agree upon the practices that they use with their child, whereas there is less discussion of their thoughts, beliefs, or attitudes relating to child sleep or any aspects of their own sleep.

It was expected that parental discordance across cognitions and sleep-related practices employed, particularly those relating to child sleep, may have predicted child sleep. However, no significant predictors of objectively assessed or parentally reported child sleep were identified. This prediction was based on an awareness of the importance of consistency and regularity in approaches and routines for healthy child sleep (Vriend & Corkum, 2011; Mindell et al., 2006). Discordant parental cognitions about child sleep may be less important if parental sleep-related practices and settling methods with their child are congruent. What is not clear from the current study, but which could be clinically relevant, are whether levels of congruence or discordance amongst parental cognitions and bedtime behaviours for parents of children with CSPs are equally unimportant. Further, it is not clear whether levels of parental dyad congruence across cognitions and sleep-related practices used with their child may have a role to play in influencing parents' practices and the implementation or effectiveness of intervention methods.

8.9. Relationship between parental and child sleep

Associations were identified between aspects of the child and PNCG sleep across bedtime, sleep start time, wake-up time, and get up time. This suggests PNCG sleep patterns may be influenced by the sleep patterns of their child. These findings compare with previous work, which also identified associations between maternal and child bedtime and wake time (Mindell, Sadeh, Kwon, & Goh, 2015). Additional associations between adult sleep minutes and the child's wake-up time and get up time, again highlights the impact that a child's sleep patterns can have on the child's PNCGs sleep. This finding has clinical relevance, as previous literature has suggested one of the main reasons parents seek help for CSPs is if it impacts on parental sleep (Tikotzky & Shaashua, 2011). It had been hypothesised that an association would exist between reduced child sleep efficiency and reduced PNCG sleep efficiency. This was based on the idea that lower child sleep efficiency may be the result of increased frequency and/or duration of night-waking, which could disturb the PNCG. A possible explanation for a lack of association is that children with a lower sleep efficiency may still be awakening, but if they do not signal or disturb the PNCG, then consequently the PNCGs sleep would not be affected. Therefore, current results suggest parental sleep quantity, but not necessarily sleep quality, may be associated with their child's sleep. While only PNCG sleep was objectively assessed in this study, it is also plausible that child sleep patterns also influence other members of the household, if they cry or signal when they wake.

8.10. Parental perceptions of CSP and actual child sleep

No differences were found in the objectively assessed sleep of children who were parentally reported as having a CSP in comparison to those who did not suffer from a CSP. This is perhaps not surprising given that previous studies have suggested parents appear to be less reliable in their reporting of aspects of sleep quality, and of sleep efficiency, which was the main objective variable employed in the current study (Sadeh, 2004; Sadeh, 1996). In addition, previous evidence regarding differences between objective and subjective child sleep measures have tended to come from studies which have employed children with clinically diagnosed CSP and those without (Sadeh et al., 2007;

Sadeh, 2004). In contrast, the current study employed a general population sample and the presence of CSP was based on parental report data, which may account for the lack of identified differences in subjective parental perception and objective assessment of child sleep.

The current findings suggest that parental judgments and perceptions about their child's sleep may be based on aspects other than the child's actual sleep. This is again perhaps unsurprising, given that previous research has identified a wide range of factors, notwithstanding the child's actual sleep which influence parental perceptions of and satisfaction with child sleep. These include factors in the parent such as personality or mental state; factors in the child such as age or temperament; and broader social and familial context (Loutzenhiser et al., 2011; Sadeh et al., 2010; Sadeh, 1994). Furthermore, the only difference in objective PNCG sleep between those who perceived their child to have a CSP and those who did not were sleep minutes obtained between sleep start time and wake-up time. Differences in parental sleep efficiency also approached significance. It is perhaps surprising, given that a broad range of objective sleep variables were examined, that there was not more correspondence between the sleep of the child and the PNCG, perhaps particularly for those dyads where the child had a CSP. However, the current sample did not include children with a clinically defined CSP, and so any relationships may be weaker or more difficult to detect. At the same time, the importance of PNCG sleep minutes and sleep efficiency should not be underestimated. Previous research has suggested parental fatigue, which could be caused by reduced sleep minutes and reduced sleep efficiency, can have a negative impact on parental functioning, as well as how parents behave with their children and rate their parenting experiences (Cooklin, Giallo, & Rose, 2017; Loutzenhiser, McAuslan, & Sharpe, 2015). Therefore, parental fatigue associated with reduced sleep minutes may be more important than the child's objective sleep pattern in determining which parents view their child's sleep as problematic.

8.11. Limitations

The results of the current study need to be considered in the context of some relevant limitations. Inclusion criteria required both mothers and fathers to participate with their toddler. Similar to previous studies, this may have resulted

in a skewed sample of participating fathers who are more actively involved in parenting and in their child's sleep than is representative of the general population (Sadeh et al., 2007). Further, current results were obtained from co-habiting mothers and fathers and may not generalise to families of different construction or those with specific familial characteristics, such as single parent families or families with same sex parents.

Due to the nature of the study, there is the possibility that parents who had concerns about their child's sleep or deemed their child's sleep as problematic were more motivated or interested to participate, possibly skewing the sample. Although results appear to suggest rates of parentally reported CSPs were comparable to previous studies, the current sample did not include families whose child had a clinically diagnosed sleep problem. It is possible that the pattern of relationships between parental and child factors in families of children with a CSP may vary compared to a general population sample. Therefore, the current findings may not be generalisable to children with CSPs seen in clinical services. Nonethless, as an exploratory study which considered previously overlooked variables and the relationships between different types of parental cognitions and sleep-related practices and their relationship to child sleep, the current study has highlighted additional areas for future study. To fully elucidate relationships and their relevance for clinical practice, future studies could compare groups of children with sleep problems who are presented to clinical services with non-clinical groups. If the predictive links identified in this study are replicated in clinical groups, measures used to identify families with a child at risk of developing CSPs may need to be revised; assessment of more than the child's sleep may be important. For example, factors such as dysfunctional parental beliefs and attitudes about their own sleep, parental cognitions about child sleep, and/or low levels or knowledge, and sleep-related practices may be equally informative areas for assessment. If identified as relevant, it would be beneficial for strategies to address these aspects to be included and evaluated in the development of future interventions.

While sleep was objectively measured for the child and PNCG, this was not conducted for the other parent in the dyad. Because of this, some relationships between aspects of parental functioning, cognitions, and/or bedtime behaviours

including sleep-related practices may have been missed in the current study. Furthermore, fathers were the PNCG in only 8 of the 44 dyads included in the current study. While this may accurately reflect the proportion of fathers who act as PNCGs, some important aspects of 'parental sleep' may have been overlooked by only gathering actigraphy data from one parent.

A strength of the current study was the inclusion of both mothers and fathers, which allowed an exploration of possible similarities and differences between parents and the relationships between parental factors and child sleep. While differences were identified between mothers and fathers, the majority of PNCGs were mothers (81%). Therefore, it is not possible from the current study design to be sure that distinctions between parents reflect actual differences between mothers and fathers. An alternative explanation may be that these differences are more reflective of differences between PNCGs and those who are not the child's PNCG. Future studies should explore the contribution of parent gender and the role of the PNCG to any differences in cognitions and sleep practices, as it would be logical to think that it may be the child's PNCG who has the biggest impact on the child's sleep regardless of whether this is their mother or father. Further understanding of these relationships has potential implications for screening parents and children in relation to CSPs, as well as from an intervention perspective. If clear pathways are identified between PNCG cognitions, bedtime behaviours, sleep-related practices, and child sleep these can be assessed and, if necessary, addressed through interventions.

A further consideration is that children's sleep changes rapidly during the age range included in the study. This potential limitation was highlighted in study one, whereby different proportions of children were classified as having a CSP when based on parental report or a research definition across different age groups ranging from 6-36 months. It is therefore possible that the associations and predictive relationships identified in this study, based on children aged 12-24 months, would not generalise to children in other age groups. In fact, it is likely that certain cognitions are more or less of a concern for parents at different ages. Further, given previous results, it would be expected that parental sleep-related practices with their child would also change across development (Morrell & Cortina-Borja, 2002). Therefore, there may be specific

age-dependent relationships between parental cognitions, sleep-related practices, bedtime behaviours, and child sleep, which have not been identified.

As there were no existing standardised and validated measures of parental dysfunctional cognitions about child sleep (focusing on similar aspects as the DBAS), parental sleep-related practices relating to their own or their child's sleep (beyond PIBBS assessing settling strategies parents used with their child), or knowledge about sleep in adults and children, it was necessary to adapt measures to serve these purposes. Every attempt was made to ensure adaptations were appropriate to assess these different aspects, but it is possible some measures used may not accurately assess the intended constructs. In addition, to assess levels of parental congruence across variables, there was a need to produce overall scores for these variables (rather than descriptively interpret each item, as was the original intention for the SPAQ scales). In view of this, attempts have been made to avoid overstating the salience of the results obtained via these exploratory measures.

There are some possible limitations regarding the actigraphic measurement of sleep which need to be considered. It is worth noting that there was not complete correspondence between the actigraph recording week and the time period being reflected upon by parents when they were completing the questionnaires. Questionnaires were completed during the actigraph recording week but required parents to reflect on 'the last few typical weeks'. It is therefore possible that any differences in sleep or associations with other variables, between subjective and objective measures arise due to the fact that they were not assessing 'sleep' over exactly the same time period. However, it should be noted that in asking parents to report 'typical' sleep and also to bring to our attention any actigraphy recording nights which were not 'typical' so that they could be excluded, the impact of this was hopefully minimised.

Child sleep data was collected from actigraphs placed on the ankle or wrist. The placement of these devices can impact upon raw activity score data, however, the sleep scoring algorithms applied in the current study is based on relative scores meaning the placement of the actigraphy is less influential. Studies that have compared data collected from different placement sites on children have

shown actigraphs are reliable at identifying child sleep/wake states and that there are no significant differences between toddler sleep data collected from wrist and ankle placement (Belanger, Bernier, Paquet, Simard, & Carrier, 2013; Meltzer, Montgomery-Downs, Insana, & Walsh, 2012). In addition, there were only 2 children in the current study who were reported to wear the actigraph on their wrist instead of ankle. Therefore, and to ensure the largest sample size could be included in analysis, actigraphy data collected from children whose actigraph were placed on wrist or ankle was included and it is not expected this difference in placement impacted upon the actigraphy data.

Actigraphic data collected on both weekdays and weekends was included to increase the number of recording nights obtained for each family, as long as the individual night was not highlighted (by parents or upon review by the researcher) as unusual. While it is possible that children's weekend sleep patterns may not reflect their weekday sleep it is common for the sleep pattern of children in the age groups involved in this study to not significantly differ across weekdays and weekends (Williams, Frederick, Zimmerman, & Bell, 2013; Thorleifsdottir, Bjornsson, Benediktsdottir, Gislason, & Kristbjarnarson, 2002).

Two families with twin children participated in the study and were included in the analysis. These families were included because of the possibility that associations between the parental variables of interest could vary with each of their children. While parents completed different questionnaires for child specific variables, there is the possibility that including the twins inflated the possible influence of their shared environment and/or parenting factors. In addition, parental data of the twins was included twice and so it is possible that this inflated the influence of these parents on the results.

The current sample was comparatively small in comparison to previous similar studies (Tikotzky & Shaashua, 2011; Sadeh et al., 2007). This may mean that there was a lack of statistical power to identify small effects and have an impact upon the ability to generalise the findings. Many of the statistical tests conducted in this thesis were exploratory in nature. It is acknowledged that some regressions included a large number of predictor variables, however

given the complex nature of CSPs and the broad range of variables that have previously been associated with them it was deemed essential to include an appropriate range in order to take a holistic, broad view of factors which could be influencing CSPs and avoid making spurious claims about the importance of a narrow range of variables. Therefore, even though some of the particularly larger regressions in study two could be considered to be under-powered the intention of running these tests was to consider a range of factors which have previously been implicated in CSPs and to identify areas for further study. While a larger sample size would have been desirable, particularly for the larger study two regressions, every attempt was made to include as many families as possible in the analysis. However, it was challenging to recruit, particularly for study two, possibly due to the requirement that both parents participated in a time-consuming study. Given the exploratory nature of this study and the array of data collected from each family along with the range of associations and predictive relationships identified, it is hoped that these points do not detract from the overall value of the findings.

Finally, it is possible that the current sample does not reflect the social or cultural aspects of the wider general population. Parents in the current study were predominantly well educated (the majority of participants were educated to Bachelors degree level as a minimum), employed in skilled and professional occupations, and living in two counties in South West England for practical reasons in order to facilitate data collection. Because of this, caution must be taken when interpreting or generalising these results. However, the sleep of both adults and children in the study is comparable with other samples and this suggests it is valid to draw comparisons and conclusions based on this sample.

8.12. Future studies

A number of suggestions for future research have been touched upon in the body of the discussion. In addition, the current study has highlighted a new relationship between parental cognitions about their own sleep and the cognitions they hold about their child's sleep. This has potential theoretical implications in terms of models of children's sleep and clinical implications for treatment methods. However, as this was only a comparatively small exploratory study, it would be beneficial for future studies to explore whether

this relationship is replicated in other samples. Attention to parents' cognitions about their own sleep also raises the possibility of addressing these cognitions preventatively. Future studies could seek to develop and explore the efficacy of such interventions, which could more explicitly and broadly address both cognitive and behavioural aspects of CSPs.

As this study was cross sectional in design, parental cognitions, sleep-related practices, bedtime behaviours, and sleep (adult and child) were only assessed at one-time point. To identify any age-dependent relationships and explore the persistence of any aspects, it would be useful for future studies to explore the relationships identified in this study over longer time periods, including baseline pre-natal assessments. Such studies would contribute to the identification of which aspects are mostly strongly related to or predictive of CSPs throughout childhood. This may allow for preventative or intervention aspects at different developmental time points to be highlighted. Once appropriate factors have been identified as being problematic in children's sleep, future studies can explore possible approaches to intervening and addressing these from a preventative perspective, before these problematic factors have a negative impact upon child sleep.

The current measures available to assess parental cognitions and sleep-related practices (including bedtime behaviours), as well as knowledge in relation to child sleep, lack depth and breadth. Only a small number of measures have been developed, and many of these existing measures capture only a limited range of aspects that could be relevant to child sleep and CSPs. It would be beneficial for future studies to develop reliable assessment tool(s) which allow a wider range of aspects to be assessed. The current results suggest it may be beneficial to incorporate assessment of broader parental cognitions than just those relating to their child's sleep, as well as more general parental sleep-related practices, and parental knowledge about child sleep. Designing and validating tools, which accurately assess these aspects, would facilitate further studies and help to increase understanding about the links between parental factors and child sleep.

When the role of parental congruence or discordance across cognitions, knowledge, sleep-related practices, and the links with child sleep were explored in this study, no significant relationships were identified. However, it could be beneficial for future studies to explore these links further in children who meet clinical criteria for a CSP and a control group, and also to look at the moderating effect of parental discordance in these areas on intervention implementation and outcome.

8.13. Study two conclusion

In conclusion, the current results contribute to a growing body of literature that has identified links between parental cognitions, bedtime behaviours, and child sleep. The current study provides two main novel contributions. Firstly, higher levels of parental dysfunctional attitudes and beliefs about their own sleep were predictive of higher levels of worries or concerns about their child sleep. Secondly, notable differences between mothers and fathers were evident in the pattern of relationships between parents' cognitions, sleep-related practices, and child sleep. These findings have theoretical, research, and clinical implications. From a theoretical perspective, in addition to the comprehensive range of variables suggested to play a role in determining child sleep by the transactional model (Sadeh & Anders, 1993), these results suggest that parental dysfunctional cognitions about their own sleep may also need to be incorporated into theoretical models. From a research perspective, the differences identified between how maternal and paternal cognitions, thoughts, and behaviours related to their reports of child sleep highlight the importance of including both parents in future studies, as it is not clear whether actual differences are present between the parents or if it is instead more salient which parent is the PNCG.

From a clinical perspective, current findings appear to suggest that interventions addressing parental cognitions, as well as their sleep-related parenting behaviour and bedtime behaviours, may be helpful. However, it is not currently clear whether addressing parental factors relating to their own sleep directly influences parental cognitions and/or sleep-related behaviours with their child. Results indicate that parents' reports of child sleep and the child's objective sleep patterns are not synonymous, again with implications for research and

clinical services. These findings raise the possibility that preventive approaches and/or interventions for CSPs could be tailored to better meet the needs of the whole family. For some families, interventions of a behavioural nature may be suitable. Other families may require additional components for successful treatment. If parental cognitions influence choice of sleep-related practice or use of particular bedtime behaviour, changes to cognitions may be required to support parents in making necessary behavioural changes. For other parents, a lack of knowledge about sleep may also need to be addressed.

8.14. Chapter summary

This chapter has considered the key findings of study two in relation to the broader literature addressing parental influences on child sleep, focusing on parental cognitions, knowledge, sleep-related practices and bedtime behaviours. The possible implications of these findings, along with the potential limitations and opportunities for future research, were also presented. The following chapter will provide a general discussion of the key findings across both study one and study two.

Chapter 9

General Discussion

9.1. Introduction

The overall aim of this thesis was to develop existing knowledge of two aspects of child sleep that have not previously been systematically investigated: parental help-seeking behaviours for child sleep, and parental influences on child sleep. Across both studies a range of parental variables were assessed with a focus on sleep-related cognitions (thoughts, beliefs, and attitudes), knowledge, and bedtime behaviours, and the influence of these variables on child sleep. This chapter will begin by providing a brief reiteration of the original aims of study one and study two and the key findings from both studies. These findings will be discussed in relation to existing literature. Possible limitations of the thesis will be highlighted along with a discussion of findings in terms of possible practical implications and future research directions.

9.2. Overall findings

9.2.1. Study one summary

This study sought to investigate the help-seeking behaviours of UK parents in relation to infant and toddler sleep. Nearly three-quarters of parents had sought information, help, or advice for child sleep at some point during their child's life. Clear parental preferences for using a range of informal sources were revealed,

and only HVs were a widely used HCP source. A range of themes emerged regarding what parents found most useful about the sources they had previously used, as well as parental barriers to seeking help and making use of sources. Sleep hygiene and behaviourally based treatment methods emerged as the most commonly suggested to parents to improve child sleep. Parentally reported preferences for and experiences of different treatment options, as well as barriers to parents implementing treatment suggestions or seeking help, were highlighted. Parents' existing reported source use differed from what they would prefer to be available to them in an ideal world.

9.2.2. Study two summary

This study explored a range of parental factors, including cognitions, knowledge, and behavioural practices related to their own and their child's sleep and the relationship between these factors and child's actual sleep. Across both mothers and fathers, cognitions about their own sleep predicted cognitions about their child's sleep. As has previously been found, increased parental involvement in settling their child was associated with poorer child sleep, whilst the use of bedtime behaviours that encouraged autonomy was associated with better child sleep. Notable differences were identified between mothers and fathers across a range of variables, including for the types of cognitions held about their child's sleep and the pattern of variables which predicted parental perception of a child sleeplessness problem (CSP) (for mothers, use of active physical comforting and sleep-related practices with their child, and for fathers, also use of active physical comforting but alongside their overall level of concern about their child's sleep). Parental knowledge about child sleep appeared to be adequate, although lower levels of parental knowledge about child sleep was associated with the use of poorer parental sleep-related practices with their child, across both mothers and fathers.

9.3. Integrating the findings

This thesis has contributed to existing knowledge regarding help-seeking behaviour relating to child sleep and the relationships between parental cognitions, knowledge, sleep-related practices, and child sleep. This section will consider a number of key points which emerge from integrating findings from both studies.

9.3.1. Measures and classifications of child sleep

Across studies one and two, children were classified into those with a CSP and those without, based on parental and research definitions. Like previous findings, results suggested that different proportions of children were categorised as having a CSP when different criteria were used to measure and define the child's sleep (Morrell, 1999). These differences are perhaps unsurprising given that some criteria, such as the research definition used in this study, are based on parental report of the frequency and/or duration of sleep disturbance or problematic sleep behaviour, while other criteria such as parental perceptions of child sleep may, as has been indicated by previous literature, be influenced by aspects outside of the child's actual sleep (Loutzenhiser et al., 2014; Jenni & O'Connor, 2011). These findings have broader implications for how children's sleep is categorised in clinical and research contexts. Clear consideration needs to be given to which definitions are employed, as use of different criteria can influence the proportion of children who are determined as having a CSP or not. This also has clear implications for the interpretation of data from prevalence studies which are commonly based on parental reports and therefore, may not provide an accurate account of child sleep and ultimately overall prevalence rates (Byars et al., 2012; Mindell et al., 2010b; Wake et al., 2006).

Further, in study two, child sleep was also measured objectively and no differences were found between the sleep of children who were parentally reported as having a CSP and those who were not reported to suffer from a CSP. As has previously been mentioned, this suggests that parental perceptions of child sleep were not necessarily based solely on the child's sleep. In addition, as has previously been found, this highlights inconsistencies between subjective parental report and objective assessments of child sleep (Sadeh, 1996). This has implications for which measure is best used to assess child sleep. Choice of assessment measure may clearly be determined by the characteristic of sleep that is to be assessed or, in a research capacity, the question to be answered (Sadeh, 2015).

Results suggest that different child sleep assessment methods may not necessarily be interchangeable or directly comparable. Instead, different

methods may actually assess different aspects. Therefore, as previous research has suggested, where appropriate and feasible, it would be valuable to employ both objective and subjective measures (Sadeh, 1996) to ensure child sleep behaviour is accurately assessed. The current findings also suggest that assessing child sleep using subjective and/or objective assessments may not be adequate. Instead, child sleep may need to be considered more dynamically, including assessing broader parental factors as it appears aspects such as parental perceptions, expectations, and beliefs about sleep may also influence how parents think, feel, and appraise their child's sleep. Further, from a clinical perspective there are implications for what aspects should be assessed in the parents and child when CSPs are screened for, and what help and support is required. Existing measures may be overlooking key factors that contribute to CSPs, as well as aspects that may need to be addressed through interventions.

9.3.2. Importance of broader parental thoughts, beliefs, and attitudes

Previous studies have explored parental cognitions about child sleep, and certain types of thoughts have been clearly implicated in CSPs (Tikotzky & Shaashua, 2012; Tikotzky et al., 2010; Sadeh et al., 2007; Morrell, 1999). While the same pattern of findings was not identified in the current thesis, a much wider range of thoughts, beliefs, and attitudes were assessed, and results suggested that parental cognitions about child sleep might be only one of the ways in which parental thoughts are related to child sleep. A novel finding, which extends existing knowledge, was the identification that parental cognitions about their own sleep predict their cognitions about their child's sleep. Further, desired parenting approaches and beliefs were also found to be clearly relevant to parental expectations, interpretation, and help seeking in relation to child sleep. Therefore, broader parental thoughts and attitudes than have previously been explored are suggested as being influential to how parents think about and seek help for their child's sleep.

Further research is required to fully elucidate the possible role of parental cognitions, attitudes, and beliefs in shaping child sleep and their potential role in CSPs. However, these findings clearly suggest that broader aspects need to be considered when exploring the mechanisms that underlie CSPs and possible

areas relevant for intervention. As has previously been highlighted, there are a broad range of aspects which may influence how parents perceive and use intervention methods such as the acceptability of methods to parents, including the underlying principles of the method, the practicality of methods in individual circumstances, and likelihood of compliance (Etherton, Blunden, & Hauck, 2016; Tse & Hall, 2008; Wiggs, 2007). Current results clearly illustrate that beliefs about the nature of behaviourally based methods, even if erroneous, may preclude parents from attempting or successfully implementing them. Addressing parental thoughts, expectations, and attitudes may be essential to influence parents' understanding of child sleep and CSPs, as well as engagement with sleep management options. Hence CBT based methods that address both cognitive and behavioural aspects may not just be beneficial but essential in some cases to support the implementation of the behavioural aspects (Tikotzky & Sadeh, 2010).

9.3.3. Parental knowledge about child sleep

In contrast to previous results that have found parental knowledge about child sleep to be poor, the results presented in this thesis suggested overall levels of parental knowledge about child sleep to be reasonably good across both studies (McDowall et al., 2017; McDowall et al., 2016; Owens et al., 2011; Schreck, & Richdale, 2011). However, previous studies have tended to use samples with broad child age ranges and fewer knowledge questions, unlike the questionnaire used in the current study that included 19 items across a range of different aspects of knowledge, which may have contributed to the differences identified. Further, while general sleep-knowledge appeared adequate there was variability in the topics about which parents were knowledgeable. Across both studies, parents appeared to be less knowledgeable about the role of external factors on child sleep, which may be salient for CSPs if these external factors directly impair the development of healthy child sleep habits or routines. Furthermore, in study one, many parents reported that they perceived themselves to lack knowledge and understanding about child sleep. Because of this perceived lack of knowledge, similar to previous studies, there was a clear desire from parents to obtain additional information regarding child sleep (Barnes et al., 2008).

As has been identified in previous studies, parental knowledge was found to be associated with specific aspects of parental behaviours and the child's actual sleep (McDowall et al., 2017; Owens et al., 2011; Owens & Jones, 2011). Specifically, lower levels of parental knowledge about child sleep, across both mothers and fathers, was directly associated with the use of more problematic parental sleep-related practices with their child. A possible speculative explanation for this finding is that parents who lack adequate knowledge of child sleep may not be aware of the basic requirements for establishing healthy child sleep habits. For example, parents who are not aware of basic sleep hygiene principles may not realise that the sleep-related practices that they employ with their child may not be conducive to establishing positive associations and healthy sleep habits in their child. This may also account for the result that poorer parental knowledge about child sleep was associated with poorer child sleep, when determined by the research definition. Therefore, the results clearly highlight that parental knowledge about child sleep may be a salient factor in CSPs and a suitable target for intervention based on the rationale that improving knowledge may translate into improved parental sleep-related practices with their child and potentially also child sleep itself.

However, it is important to acknowledge that previous research suggests that improving knowledge does not necessarily translate into improved child sleep (Wilson, Miller, Bonuck, Lumeng, Chervin, 2013; Adachi et al., 2009). These results suggest that as a standalone method improving parental knowledge alone may not be sufficient to improve child sleep. However, in many cases imparting knowledge or information about child sleep forms part of interventions to improve child sleep (Mindell et al., 2006). In addition, given the links between parental practices and child sleep, improving parental knowledge and understanding about these links and child sleep more generally is unlikely to be unhelpful, although further empirical evidence is required to validate the claim that improving parental knowledge about child sleep will promote the use of healthy sleep-related practices.

9.3.4. Terminology related to intervention

A key challenge for clinicians and researchers in comparing individual study findings and synthesising the existing literature on child sleep is the range of

different intervention-related terminology which is used. Terms are frequently used inter-changeably, even though the terminology can represent very different things (Meltzer et al., 2012; Sadeh, 2011). This also appears to be a pertinent issue for many parents, as many terms such as 'sleep training' or 'cry it out' were commonly used to describe any behaviourally based sleep intervention method. Further, the use of such terminology was associated with considerable negative connotations for many parents, whose perceptions were that all of these methods necessitated parents leaving their children to cry. The apparent misunderstandings or misuse of terminology, alongside concerns about long-term consequences, negatively influenced parental perceptions and use of behaviourally based interventions.

It is concerning that some parents may categorically avoid any type of behavioural intervention based on their potentially erroneous perception of what the term means, and what such methods may entail. This is especially pertinent given the strong evidence base for the efficacy of behaviourally based methods (Meltzer & Mindell, 2014; Mindell et al., 2006). Although it would be a challenging and time-consuming endeavour, thesis results suggest that it would be useful, where possible, to clarify and standardise the terminology used both in research and clinical environments, as well as in the parenting literature, to attempt to ensure they are used consistently.

9.3.5. Mothers and fathers

Previous research exploring factors associated with child sleep has focused almost exclusively on mothers (Tikotzky, 2017). In line with previous research, mothers remained most likely to adopt the role of PNCG (Tikotzky, Sadeh, & Glickman-Gavrieli, 2011). Nevertheless, previous studies have suggested that some families split parenting responsibility for settling and overnight childcare (Tikotzky et al., 2011; Goodlin-Jones et al., 2001). In a small number of studies where paternal involvement has been investigated, greater input from fathers has been found to be linked to improved child sleep and reduced maternal stress (Millikovsky-Ayalon, Atzaba-Poria, & Meiri, 2015; Tikotzky et al., 2011). Even in cases where mothers are the PNCGs, fathers may still have an input in how their child's sleep is managed. This may involve being active in decisions

about their child's sleep, as well as supporting, or in some cases undermining, maternal choices and chosen child sleep management options (Tikotzky et al., 2011). Therefore, to fully understand CSPs and ensure interventions clearly address any potential factors that may be contributing to or perpetuating CSPs, it is important that the role of both mothers and fathers, and their interaction, are researched and understood. Future research should explicitly include both parents when exploring child sleep and influences on it.

Study two adds to a small body of existing literature that has identified differences between maternal and paternal factors, as well as how they relate to child sleep (Ng et al., 2012; Tikotzky et al., 2010; Sadeh et al., 2007). In the current thesis, clear differences were identified between mothers and fathers in the cognitions they held about child sleep, the role of parents' own sleep-related practices, and their relationship with the sleep-related practices they employ with their child, as well as the variables which predicted parental perceptions of a CSP. Further research is required to extend our knowledge of the role of both parents in child sleep. A more overt focus on involving both parents would reflect broader social, policy, and research changes which have increasingly acknowledged the role of fathers and sought to engage fathers in children's health and development (Olley & Potter, 2012; Phares, Lopez, Fields, Kamboukos, & Duhig, 2005). Although, as has previously been mentioned, it may be that differences between the PNCG and non-PNCG are more pertinent than between mothers and fathers, future research is required to explore this speculation. Nevertheless, including both parents in future research would be valuable.

9.4. Practical Implications

A number of practical implications arise from the findings of this thesis. Previously only cognitions relating to child sleep had been explored (Tikotzky & Shaashua, 2012; Tikotzky & Sadeh, 2009; Morrell, 1999). However, the results suggest that other, broader types of parental cognitions, as well as other parenting factors, may need to be more actively considered, measured, and where necessary addressed as part of clinical practice for CSPs. Specifically, this could be addressed in terms of what parental and child aspects are screened for in relation to CSPs, as well as how treatment methods are tailored

to individual families. Alongside existing work, results clearly support the proposal that interventions should address not only behavioural but also cognitive aspects of CSPs (Tikotzky & Sadeh, 2010; Owens, France, & Wiggs, 1999).

Assessing, and if necessary correcting, any dysfunctional parental cognitions or erroneous beliefs may lead to improvements in parental bedtime behaviours, and sleep-related practices used with their child, or support parental consideration of and engagement with behavioural interventions. Further research is required to identify the effects of different components of treatment (in isolation and in combination), even though it is sometimes challenging to differentiate methods, as many behaviourally-based methods also include elements that address cognitive aspects, even if this is not explicitly highlighted. However, the medical research council (MRC) offers guidance on how the evaluation of complex interventions such as these could be approached (Moore et al., 2015; Craig et al., 2008).

Alongside previous evidence, findings from this thesis suggest that parental knowledge may be a key factor related to the practices parents employ with their child and also the child's actual sleep (McDowall et al., 2017; Owens et al., 2011; Owens & Jones, 2011). Previous research has clearly demonstrated that parental knowledge can be improved through delivering developmentally appropriate information and advice (Jones et al., 2012; Mindell et al., 2006). Therefore, parental knowledge about child sleep appears to be a currently underexplored area that may be important for understanding and managing CSPs. However, future research is required to elucidate the efficacy of parental education as a preventative or intervention approach.

A more systematic approach to delivering information or guidance to parents about child sleep could also be useful. Current results suggest that, as some online resources (such as babysleep.com and Infant Sleep Information Source) have begun to attempt to do, developing information and guidance for parents on key aspects of child sleep and features of sleep hygiene tailored to the key issues for children of different age groups, may be beneficial. Providing parents with the opportunity to obtain information about child sleep, including on a range

of sleep management and intervention methods (e.g., what they are; common parent experiences of using this approach; and what evidence, if any, supports their use) may help improve parental knowledge about child sleep. In turn, this could help to ensure that parents are appropriately informed and effectively supported to feel confident about establishing healthy sleep habits in their infants and toddlers and implementing intervention options if necessary.

Previously, very little was known about the help-seeking behaviours of UK parents. Current findings are in agreement with results from other studies which have suggested that parental thoughts, feelings, and attitudes are important determinants of parental choice and successful implementation of treatment options (Etherton et al., 2016; Tse & Hall, 2008; Wiggs, 2007). This emphasises the need for information available to parents to include clear and explicit acknowledgement of potential individual differences in what parents want. Future resources (sources of information, advice, and help, as well as the content of interventions) should be developed to more overtly acknowledge the variability in what parents think, feel, and believe about child sleep, as well as the type of information and/or treatment methods they may desire and find acceptable. Doing so may help to ensure a greater number of parents who desire or require information or support go on to seek and make use of reliable and evidence-based information and sources.

Subjective parental report measures based on the frequency and/or duration of specific sleep behaviours are a common method used to assess child sleep (Lewandowski, Toliver-Sokol, & Palermo, 2011). However, current findings suggest that used as a standalone assessment tool, these types of subjective measures may not be adequate to comprehensively assess child sleep. It appears assessments may also need to consider broader parental factors (such as parental cognitions about sleep, perceptions of child sleep, parental sleep knowledge, and parenting beliefs). From a research and clinical perspective, having an accurate account of the child's sleep itself is key, but understanding parenting factors and familial context may also better place clinicians to offer appropriate help and support to improve the child's sleep and overall family functioning.

9.5. Limitations and future research

The specific limitations pertinent to each study have already been discussed in detail in sections 5.9 and 8.11. Cutting across both studies, there are potential limitations related to possible sample bias (in relation to the child's sleep and the lack of diversity of families in terms of demographics), the fact that age-specific effects were not systematically examined, and that the use of some novel assessment tools leave questions of uncertainty about whether these measures accurately assessed the intended constructs.

It is important to acknowledge a possible limitation due to the impact of multiple testing, which has been conducted, particularly in study two. There is the possibility that this has inflated the possibility of type 1 errors. However, as has previously been mentioned the purpose of study two was to be exploratory and investigate the possible influence of a large number of variables on each other and ultimately on CSPs. Given that many variables were explored in different ways (e.g. as predictor and outcome variables) and the intention of the study was to attempt to unpick the complex relationship between the variables included to highlight areas of interest for future studies, adjustments for multiple comparisons were not made to multiple regression analyses. For correlational analyses where variables were explored in multiple analyses, results were reported both with and without Bonferroni corrections and many of the key relationships identified remained significant and worthy of future exploration. However, where appropriate findings need to be interpreted with caution and require further confirmatory research.

Some possibilities for future research have been highlighted earlier in this chapter, where relevant. With the above limitations and the exploratory nature of the current thesis in mind, reported results need replication. Specifically, future research should seek to further explore the relationship between different types of parental cognitions (including those about their own sleep) and child sleep. If the relationships identified in this thesis are replicated, this may offer an early intervention target for parents who hold problematic cognitions. The importance and role of broader aspects of parenting, such as thoughts, knowledge, beliefs, and attitudes also require further exploration. If relationships

are established, it could be of value to develop short but reliable assessments of parental knowledge about child sleep for use alongside brief screening measures for parents' sleep-related cognitions. Early identification of where this has resulted in parenting which may not be conducive to child sleep may mean preventative or early interventions could address these aspects before they negatively influence broader parental thoughts, behaviours, and child sleep.

Future work should seek to explore parental help-seeking behaviours and the influence of parental factors in child sleep in broader, more representative samples, including exploring the relationship between parenting and child sleep in families where the child has a clinical diagnosis of a CSP. In addition, future research exploring the role of parental factors in child sleep should endeavour to include both parents and employ objective and subjective assessment of child sleep, and carefully consider which form of subjective assessment might be most suitable.

9.6. Conclusion

This thesis has contributed new findings to current knowledge in two areas, neither of which have been systematically investigated: UK parents' help seeking in connection with child sleep, and broad investigation of ways in which parents and aspects of parenting are related to child sleep.

In relation to the first area, results suggest that a range of sources is required to support parents for child sleep as many seek and derive diverse benefits from different sources. Findings have highlighted specific ways in which sources could be developed to provide more comprehensive support, which better meets parents' diverse needs.

In relation to the second area, results indicate that a broader range of parental and parenting factors than have previously been considered may also need to be included in conceptualisations of child sleep; how parents think and feel about sleep (their own and their child's) may play a role in how they perceive and behave in relation to their child's sleep, as well as how they manage and if necessary 'treat' their child's sleep.

Overall, the findings emphasise the importance of considering broader familial context, including both parents, and being mindful of their individual thoughts, beliefs, attitudes, and knowledge, as well as their behaviours when attempting to understand child sleep and CSPs, in both research and clinical settings.

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Appendices

Appendix 1. Brief Infant Sleep Questionnaire (BISQ) items

1. How much time does your child spend in sleep during the NIGHT (between 7 in the evening and 7 in the morning)?
Hours: _____ Minutes: _____

2. How much time does your child spend in sleep during the DAY (between 7 in the morning and 7 in the evening)?
Hours: _____ Minutes: _____

3. Average number of night wakings per night: _____

4. How much time does your child spend awake from 10 in the evening to 6 in the morning?
Hours: _____ Minutes: _____

5. How long does it take to put your child to sleep in the evening?
Hours: _____ Minutes: _____

6. How does your child fall asleep?
[ ] While feeding
[ ] Being rocked
[ ] Being held
[ ] In bed alone
[ ] In bed near parent

7. What time does your child usually fall asleep for the night? Please write this time in 24-hour clock format. For example if your child fell asleep at 10.56pm, please write this as 22.56.
_____

8. Do you consider your child's sleep as a problem?
[ ] A very serious problem
[ ] A small problem
[ ] Not a problem at all

Appendix 2. Parental knowledge and understanding of child sleep. Original SPAQ items included and adapted wordings used to assess parental knowledge about child sleep (SPAQ-C-K).

The left column shows original SPAQ items included to assess (in study two) parental knowledge (SPAQ-A-K) items included and their wording. Any items omitted are highlighted with 'removed' in the right hand column. Text in the right hand column shows the adapted item wording to ensure items were relevant to assess parental knowledge and understanding about aspects relating to child sleep.

Original SPAQ items (adult)	Adapted SPAQ-C-K wording
My work affects when and how much I sleep	My child's day affects how much they sleep
Home responsibilities affect when and how much I sleep	Our home/family environment affects how much my child sleeps
My commute affects when and how much I sleep	**Removed**
My sleep is affected by medical conditions (like heart, breathing, or pain)	My child's sleep is affected by medical conditions (like heart, breathing, or pain)
I have difficulty with sleep	My child has difficulty with their sleep
Sometimes when I am feeling down or depressed, it affects my sleep	Sometimes if my child is feeling upset, it affects their sleep
Sometimes my sleep is affected because I feel unsafe at night	**Removed**
I have control over when and how much I sleep	I have control over when and how much my child sleeps
I care about making sure that I have enough time to sleep	I care about making sure that my child has enough time to sleep
Getting enough sleep is important for me to be able to enjoy the day	Getting enough good quality sleep is important for my child to be able to enjoy the day
Going to bed at a good time is important to me	Getting my child to sleep at a good time is important to me
My sleep is important to my health	Sleep is important to my child's health
My sleep is affected by stress and/or worrying	**Removed**
Not enough sleep can lead to serious consequences	If my child does not get enough sleep this can lead to serious consequences
Poor sleep affects the quality of my life	Poor sleep affects the quality of my child's life
Dozing while driving a vehicle is serious	Removed

Original SPAQ items (adult)	Adapted SPAQ-C-K wording
My doctor has discussed the importance of a regular sleep schedule	My child's health professional has discussed the importance of a regular sleep schedule for my child
My doctor has discussed the importance of getting enough sleep	My child's health professional has discussed the importance of my child getting enough sleep
If you are really bored, you might fall asleep, even if you slept well the night before	If my child is really bored, they might fall asleep, even if they slept well the night before
Lying in bed with your eyes shut is as good as sleeping	If my child lies in bed with their eyes shut that is as good as sleeping
I can tell when I am sleepy	I can tell when my child is sleepy
Opening the car window is a good way to wake me up if I am drowsy while driving	**Removed**
Turning up the volume of the radio or music is a good way to wake me up if I am drowsy while driving	**Removed**
People who fall asleep at work or school are lazy or have bad habits	Children who fall asleep at nursery or school are lazy or have bad habits
When growing up my parents emphasized the importance of sleep to me	I prioritise the importance of sleep to my child
It is important for children who are growing up to get healthy sleep	Getting enough good quality sleep is important for children when they are growing up
Getting healthy sleep is important for adults	**Removed**
Getting healthy sleep is important for older adults/seniors	**Removed**
I think my sleep is important	I think my child's sleep is important

Classification of parental knowledge and understanding (SPAQ-C-K) items

In right hand column, items highlighted in green were classified as representing positive or good sleep-related knowledge. Items highlighted in red were classified as representing negative or bad sleep-related knowledge. Items in black were omitted from classification.

Appendix 3. Study one online questionnaire

PI sheet and consent box to be shown here online

Exclusion questions:
Where are you based (country)?
[ ] UK [ ] Other, please specify……..

Do you currently have a child aged between 6 – 36 months?
[ ] Yes [ ] No

If parents are not based in the UK and/or do not have a child aged between 6 – 36 months they will be thanked for their interest but will not be able to continue the questionnaire. For those who are based in the UK and have a child in the age range of 6 – 36 months they will continue on to the questionnaire in full:

Section A:

A.1. Do you consider your child's sleep a problem?
[ ] Yes [ ] No

(only shown if participants answer yes to A.1)
A.2. Please could you provide additional information about why you feel your child's sleep is a problem for your child, you or your family?
Please provide as much detail as possible

A.3. Have you ever sought advice, information or help for your child's sleep:
[ ] Yes [ ] No *(If no participants will automatically go to section B)*

A.4. From where have you sought advice, information or help for your child's sleep? Please select all that apply:
[ ] Health Visitor
[ ] Midwife
[ ] Doctor
[ ] Other healthcare professional. Please specify……..
[ ] General internet search for relevant information / websites
[ ] Trusted parenting / health website with which I am familiar and know to go to directly to seek information. Please specify ……..
[ ] Book. Please specify which book (if possible)…….
[ ] Leaflet from healthcare professional (e.g doctor, nurse, health visitor, midwife)
[ ] Family member. Please specify…….
[ ] Friend
[ ] Other parents from a group (e.g toddler group, online parenting group, NCT). Please specify what group……..
[ ] Children's centre

[ ] Nursery or childcare facility
[ ] Other. Please specify…….

A.5. From those you have selected above what were the most useful to you for advice, information or help for your child's sleep and why?
Please provide as much detail as possible

A.6. Have you ever received any specific suggestions for improving or treating your child's sleep?

[ ] Yes [ ] No (if no, participants will skip to section C)

A.7. If you have received any specific suggestions for improving or treating your child's sleep what sort of methods were proposed? Please select all that apply:
[ ] Controlled crying or cry it out (not attending to my child when they cry)
[ ] Checking my child at fixed intervals when they cry
[ ] Gradually extending the amount of time I let my child cry
[ ] Staying with my child if they were crying but gradually reducing my presence or contact
[ ] Co-sleeping with my child
[ ] Having physical contact with my child when they are trying to get to sleep
[ ] Returning my child to their own bed if they come out of their bed
[ ] Giving my child a 'bedtime pass' which they can use to come out of their room once during the settling period
[ ] Rewarding my child to encourage positive sleep behaviour
[ ] Scheduled awakenings (waking my child during the night at times agreed with the health professional)
[ ] Make changes to my child's sleep environment (e.g. curtains, bedding, temperature, noise level)
[ ] Make sure my child's sleep wake times were regular (e.g. consistent bed and morning wake times)
[ ] Make sure my child's set bedtime was around the time when they usually fell asleep at night
[ ] Taking my child out of bed if they were not asleep within 15-20 minutes and only returning them to bed when they seemed sleepy again
[ ] Avoid stimulating things around the sleep period (e.g energetic play)
[ ] Changing napping times
[ ] Introduce a bedtime routine
[ ] Make changes to an existing bedtime routine
[ ] Consider 24 hourly routines (introduce routines for various things in my child's life, like feeding times, daily activities)

[ ] Medication (over the counter)
[ ] Medication (prescribed)
[ ] Acupuncture
[ ] Cranial osteopathy
[ ] Use of special diet
[ ] Use of food supplement
[ ] Treatment of other condition which was causing sleep problems (e.g. medical problem)
[ ] Other. Please specify……

Questions A.8, A.9 and A.10 will be repeated for each A.7 response option parents select:
A.8. Did you try out the suggestion of "x" (*options selected in A.7)*?
Yes [ ] No [ ]

(Questions A.9 and A.10 will only be shown if participants selects Yes to A.8)
A.9. Did the suggestion of "x" (*options selected in A.7)* work?
Yes [ ] No [ ]

A.10. What are your overall opinions and experiences of "x" (*options selected in A.7)*?

(Question A.11 will only display if participants answer no to any options in Q A.8)
A.11. What reasons have stopped you trying out advice or treatment methods in the past? Please select all that apply:
[ ] I don't agree with the principles of the advice/treatment
[ ] I don't think it is going to work
[ ] I don't know anyone else who has done it
[ ] I do not think the advice/treatment applies to my child
[ ] It would not be practical for our particular family
[ ] I have tried previously and it was not helpful
[ ] I have not been shown scientific evidence that it has been shown to be helpful
[ ] Other. Please specify……..

Section B*: (only completed if parents answer no to A.3)*
B.1. If you have never sought any advice, help or treatment for your child's sleep why is this:
[ ] My child's sleep has never been something I have needed advice, help or treatment for *(if parents select this option they will automatically be directed to section C)*
[ ] Although my child had a sleep problem I chose not to seek help

(Questions B.2 and B.3 will only display if participants answer 'Although my child had a sleep problem I chose not to seek help' in Q B.1)
B.2. If you believe your child has a sleep problem and you have not sought advice, help or treatment why is this?
[ ] I believe my child will grow out of their sleep problems
[ ] Other problems in my child are more important
[ ] Other problems within the family more pressing
[ ] Have tried interventions with other child and not successful
[ ] I am not aware of any treatments which I would feel comfortable using
[ ] There are no appropriate places I can access such help
[ ] I should know how to help my child without asking for help
[ ] Other. Please specify……

B.3. What may have encouraged you, or made you want to seek help for any sleep problems your child had?

Section C: *(all parents will be directed to answer this section)*
We are interested in identifying if there are gaps between what help is currently available to parents for their child's sleep and what help and support parents may like to be available to them.

In this section please respond to questions based upon **what you feel is currently available to you.**

C.1. Where would you go to find **general information** about normal child sleep given what is **currently available** to you?
Please select all that apply
[ ] Health Visitor
[ ] Midwife
[ ] Doctor
[ ] Other healthcare professional. Please specify……..
[ ] General internet search for relevant information / websites
[ ] Trusted parenting / health website with which I am familiar and know to go to directly to seek information. Please specify ……..
[ ] Book. Please specify which book (if possible)…….
[ ] Leaflet from healthcare professional (e.g doctor, nurse, health visitor, midwife)
[ ] Family member. Please specify……
[ ] Friend
[ ] Other parents from a group (e.g toddler group, online parenting group, NCT). Please specify what group……..
[ ] Children's centre

[ ] Nursery or childcare facility
[ ] Other. Please specify…….

C.2. From those you selected above please explain a bit more about why you think these are the most useful to you for **general information** about normal child sleep given what is **currently available** to you? Please provide as much detail as possible

C.3. Where would you go to find **advice or help** for your child's sleep given what is **currently available** to you?
If your child does not have trouble with their sleep, please answer based on what you would do if your child did have a sleep problem or developed one in the near future.

Please select all that apply
[ ] Health Visitor
[ ] Midwife
[ ] Doctor
[ ] Other healthcare professional. Please specify……..
[ ] General internet search for relevant information / websites
[ ] Trusted parenting / health website with which I am familiar and know to go to directly to seek information. Please specify ……..
[ ] Book. Please specify which book (if possible)…….
[ ] Leaflet from healthcare professional (e.g doctor, nurse, health visitor, midwife)
[ ] Family member. Please specify……
[ ] Friend
[ ] Other parents from a group (e.g toddler group, online parenting group, NCT). Please specify what group…….
[ ] Children's centre
[ ] Nursery or childcare facility
[ ] Other. Please specify…….

C.4. From those you selected above please explain a bit more about why you think these are the most useful to you for **advice or help** for your child's sleep given what is **currently available** to you?
Please provide as much detail as possible

In this section please respond to questions based upon **what you would like to be available to you.** This may be different to what is actually currently available to you and instead refers to **what you would like to be available to you, in an ideal world**.

C.5. Where would you like to go to find **general information** about normal child sleep if **all of these options were available** to you?
Please select all that apply
[ ] Health Visitor
[ ] Midwife
[ ] Doctor
[ ] Other healthcare professional. Please specify……..
[ ] General internet search for relevant information / websites
[ ] Trusted parenting / health website with which I am familiar and know to go to directly to seek information. Please specify ……..
[ ] Book. Please specify which book (if possible)…….
[ ] Leaflet from healthcare professional (e.g doctor, nurse, health visitor, midwife)
[ ] Family member. Please specify……
[ ] Friend
[ ] Other parents from a group (e.g toddler group, online parenting group, NCT). Please specify what group……..
[ ] Children's centre
[ ] Nursery or childcare facility
[ ] Other. Please specify…….

C.6. From those you selected above please explain a bit more about why you think these would be the most useful to you for **general information** about normal child sleep if **all of these options were available** to you?
Please provide as much detail as possible

C.7. Where would you like to go to find **advice or help** for your child's sleep if **all of these options were available** to you? This may be different to what is actually currently available to you and instead refers to **what you would like to be available to you, in an ideal world**.
If your child does not have trouble with their sleep, please answer these questions based on what you would do if your child did have a sleep problem or developed one in the near future.

Please select all that apply
[ ] Health Visitor
[ ] Midwife
[ ] Doctor
[ ] Other healthcare professional. Please specify……..
[ ] General internet search for relevant information / websites
[ ] Trusted parenting / health website with which I am familiar and know to go to directly to seek information. Please specify ……..
[ ] Book. Please specify which book (if possible)…….
[ ] Leaflet from healthcare professional (e.g doctor, nurse, health visitor, midwife)

[ ] Family member. Please specify……
[ ] Friend
[ ] Other parents from a group (e.g toddler group, online parenting group, NCT). Please specify what group……..
[ ] Children's centre
[ ] Nursery or childcare facility
[ ] Other. Please specify…….

C.8. From those you selected above please explain a bit more about why you think these would be are the most useful to you for **advice or help** for your child's sleep if **all of these options were available** to you?
Please provide as much detail as possible

C.9. If you have any reservations about using any of these options for advice about you child's sleep now or in the future what are they? Please provide as much detail as possible

Health Professional (doctor, health visitor, midwife etc)

Internet (general search or specific sites)

Family / friends (including other parents, friends and extended family)

Written information (book, leaflet)

Other: Please specify:…….

C.10. Any other comments about your child's sleep or the help, support and/or treatment of child sleep problems?

These questions are about your child's sleep:
Please answer these questions about your child's sleep as accurately as you can. Please provide **one** answer to each question based on your child's typical sleeping habits in the **LAST TWO WEEKS**. When responding to questions with a few options, please select only **one** (most appropriate) choice.

Please complete questions about time in the following format:
Hours: __6___ Minutes: __24__
For example if your child slept from 8.00pm – 6.50am, they slept for 10 hours and 50 minutes, so you would write this as Hours: __10__ Minutes: __50__

1. How much time does your child spend in sleep during the NIGHT (between 7 in the evening and 7 in the morning)?
Hours: _____ Minutes: _____

2. How much time does your child spend in sleep during the DAY (between 7 in the morning and 7 in the evening)?
Hours: _____ Minutes: _____

3. Average number of night wakings per night: _____

4. How much time does your child spend awake from 10 in the evening to 6 in the morning?
Hours: _____ Minutes: _____

5. How long does it take to put your child to sleep in the evening?
Hours: _____ Minutes: _____

6. How does your child fall asleep?
[ ] While feeding
[ ] Being rocked
[ ] Being held
[ ] In bed alone
[ ] In bed near parent

7. What time does your child usually fall asleep for the night? Please write this time in 24-hour clock format. For example if your child fell asleep at 10.56pm, please write this as 22.56.

_____

8. Do you consider your child's sleep as a problem?
[ ] A very serious problem
[ ] A small problem
[ ] Not a problem at all

The following statements relate to child sleep. Please indicate to what extent you personally agree or disagree with each statement by selecting **one** most appropriate option per row.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
My child's day affects how much they sleep					
Our home/family environment affects how much my child sleeps					
My child's sleep is affected by medical conditions (like heart, breathing, or pain)					
Sometimes if my child is feeling upset, it affects their sleep					
I care about making sure that my child has enough time to sleep					
Getting enough good quality sleep is important for my child to be able to enjoy the day					
Getting my child to sleep at a good time is important to me					
Sleep is important to my child's health					
If my child does not get enough sleep this can lead to serious consequences					
Poor sleep affects the quality of my child's life					
My child's health professional has discussed the importance of a regular sleep schedule for my child					
My child's health professional has discussed the importance of my child getting enough sleep					
If my child is really bored, they might fall asleep, even if they slept well the night before					
If my child lies in bed with					

their eyes shut that is as good as sleeping					
I can tell when my child is sleepy					
Children who fall asleep at nursery or school are lazy or have bad habits					
I prioritise the importance of sleep to my child					
Getting enough good quality sleep is important for children when they are growing up					
I think my child's sleep is important					

Finally some questions about you and your family:

Are you the child's:
[ ] Mother
[ ] Father
[ ] Other, please specify:_____

If you wish to be entered into the prize draw to win £50 amazon vouchers, please leave your email address so we can contact you
Your Email Address: _____

Your Age (in years): _____

Your Occupation: (please select most appropriate)
[ ] Managers, directors and senior officials
[ ] Professional and technical occupations
[ ] Administrative and secretarial occupations
[ ] Skilled trade
[ ] Caring, leisure and other service occupations
[ ] Sales and customer service occupations
[ ] Manual labour, process plant and machine operatives
[ ] Unemployed
[ ] Retired
[ ] Full time parent
[ ] Other, please specify _____

Your Education: (please select highest level)
[ ] Compulsory school education
[ ] College
[ ] Vocational training or qualification (including apprenticeship)
[ ] University degree (bachelors)
[ ] University degree (masters)
[ ] Further Postgraduate education

Ethnicity: (please choose one option that best describes your ethnic group or background)
White

[ ] English/Welsh/Scottish/Northern Irish/British
[ ] Irish
[ ] Any other White background

Mixed/Multiple ethnic groups

[ ] White and Black Caribbean
[ ] White and Black African
[ ] White and Asian
[ ] Any other Mixed/Multiple ethnic background

Asian/Asian British

[ ] Indian
[ ] Pakistani
[ ] Bangladeshi
[ ] Chinese
[ ] Any other Asian background

Black/ African/Caribbean/Black British

[ ] African
[ ] Caribbean
[ ] Any other Black/African/Caribbean background

Other ethnic group

[ ] Arab
[ ] Any other ethnic group

What county, do you live in? _____

Is where you live:

[ ] Rural [ ] Village
[ ] Town [ ] City

Do you live:

[ ] Alone with your child / children
[ ] With your partner and child / children
[ ] With your partner, child and other family members
[ ] With your child and other family members.
[ ] Other. Please specify: _____

How many children are there (in total including step or adopted siblings) living in your household on a regular basis? _____ [ ] Only Child

Where did you hear about this questionnaire?

[ ] Online Advert. Please specify where: _____
[ ] Flyer. Please specify where this was displayed: _____
[ ] Parenting group. Please specify which group: _____
[ ] Oxford Brookes babylab
[ ] Word of mouth
[ ] Facebook
[ ] Twitter
[ ] Other. Please specify: _____

These questions are about **your child:**

Age (in months): _____

Sex: [ ] Girl [ ] Boy

What is the birth order of this child:
[ ] Oldest [ ] Somewhere in the middle [ ] Youngest

Was your child born at: [ ] Full term [ ] Premature, how many weeks_____

Does your child currently have any medical or developmental conditions that may affect their sleep?
[ ] Yes. Please give more details_____
[ ] No

Is your child currently taking any medication?
[ ] Yes. Please give more details_____
[ ] No

Debrief

Appendix 4. UREC approval letter

OXFORD BROOKES UNIVERSITY

Dr Luci Wiggs
Director of Studies
Department of Psychology, Social Work and Public Health
Faculty of Health and Life Sciences
Oxford Brookes University
Headington Campus

5 August 2015

Dear Dr Wiggs

UREC Registration No: 150932
Study title – Parents, children and slumber: parental influences on, and help seeking-behaviour relating to, child sleep

Thank you for your recent letter outlining your response to the points raised in my previous letter about the PhD study of your research student Georgia Cook and attaching the revised documents. I am pleased to inform you that, on this basis, I have given Chair's Approval for the study to begin.

The UREC approval period for this study is two years from the date of this letter, so 5 August 2017. If you need the approval to be extended please do contact me nearer the time of expiry.

Should the recruitment, methodology or data storage change from your original plans, or should any study participants experience adverse physical, psychological, social, legal or economic effects from the research, please inform me with full details as soon as possible.

Yours sincerely

Hazel Abbott
Chair of the University Research Ethics Committee

cc Jane Appleton, Second Supervisor
Georgia Cook, Research Student
Morag MacLean, Research Ethics Officer
Jill Organ, Research Degrees Team
Louise Wood, UREC Administrator

UNIVERSITY RESEARCH ETHICS COMMITTEE, FACULTY OF HEALTH AND LIFE SCIENCES

Headington Campus Gipsy Lane
Oxford OX3 0BP UK

Tel: 01865 482639
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www.brookes.ac.uk

Appendix 5. Study one participant information sheet

OXFORD BROOKES UNIVERSITY

Department of Psychology, Social Work & Publich Health
Headington Campus, Gipsy Lane, Oxford, OX3 0BP
Researcher: [Georgia Cook, georgia.cook-2014@brookes.ac.uk]
Supervisor: [Luci Wiggs, lwiggs@brookes.ac.uk, 01865 483710]

XXX

Understanding how, when and where parents seek help about their child's sleep

Dear parent/guardian/carer,

I am currently investigating how, when and where parents seek help about their child's sleep. I would like to invite you, to be involved in this study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

What is the purpose of the study?
Getting adequate amounts of good quality sleep is essential for our day-to-day functioning and specifically for children's development. Many infants and toddlers experience some form of sleeplessness at one time or another. There are a broad variety of potential places and sources where parents are provided with or can seek information, advice and/or treatment information (if necessary) for their child's sleep. However very little is known about how parents seek advice, information and/or find out about treatment options. To offer the most appropriate forms of information, advice and treatment options it is important we understand more about parents' preferences. Therefore this research will examine how, when and where parents seek information and advice about their child's sleep. This will include identifying preferences and barriers to using certain sources and/or treatment methods.

What will happen if I take part?
This is an online questionnaire study. If, after reading this information sheet, you are happy to take part you will follow a link at the bottom of the page which will take you to the next page where you can consent to take part in the study. You will then be directed to the research questionnaire. You will need to be able to read and write English, in order to be able to complete the questionnaire. You will need to provide a few basic details about yourself and your child and will then need to follow some simple instructions and work through the brief questionnaire. This should take approximately 10 minutes to complete in total. There are no right or wrong answers, we are just interested in finding out more about how parents seek help, advice, information and treatment options regarding their child's sleep. As part of the questionnaire you will be asked if you would like to leave an email address (this is entirely voluntary and you do not have to leave one to participate). In order to protect your anonymity questionnaire software will not record your computer IP address. All parents who fully complete the questionnaire and leave a valid email address will be entered into a prize draw to win a £50 amazon voucher.

Why have I been invited and do I have to take part?
We are keen to include parents who have a child who is aged between 6 – 36 months. All individuals who fit the research criteria who have applied directly to take part, responded to adverts, or who are part of the Oxford Brookes babylab database are being invited to take part. Your child does not need to have particularly good or bad sleep as we are interested in hearing from parents of children both with and without sleep problems. Giving your permission (by following the link and completing the questionnaire) and taking part in the study is entirely

voluntary. If you wish to withdraw from the study you may do so up until the point data is analysed by the researcher or if you are not supplying an email address up until the point you submit your response to the questionnaire.

Carrying out this research will allow the researcher to complete her PhD project and hopefully, further scientific understanding of parents and their help-seeking behaviour in relation to child sleep.

What will happen to the results of the study?
The data will be stored confidentially, within the limitations of the law, with only the researcher and supervisors having access to it and will be deleted after completion of the project. All data collected will be kept anonymously and used only for the researcher's PhD project and any publications based on this research project. In accordance with University policy, data generated in the course of the research be retained and must be kept securely in paper or electronic form for a period of ten years after the completion of a research project. No individual parent, child or family will be identified. If you wish to receive, by email, a summary of the study results when it's finished (likely to be summer 2017) please email the researcher (georgia.cook-2014@brookes.ac.uk). Email addresses will be stored confidentially with only the researcher and supervisors having access to them and will be deleted after the study summary has been sent.

Who has reviewed the research?
This study has been approved by the University Research Ethics Committee, Oxford Brookes University. If you have any concerns about how the study has been conducted, you can contact the Chair of the University Research Ethics Committee at Oxford Brookes University at ethics@brookes.ac.uk. Please do not hesitate to contact the researcher (Georgia Cook at georgia.cook-2014@brookes.ac.uk) or lead supervisor (Luci Wiggs at lwiggs@brookes.ac.uk) with any other questions or queries about this study.

What should I do if I am willing to take part?
If you agree to taking part, please read through and tick the consent box below and then click on the 'next' button which will take you to the questionnaire.

Thank you for taking time to read this. Georgia Cook

If you or your partner have any concerns about your own or your child's sleep, now or in the future you can get further guidance and information from the NHS http://www.nhs.uk/LiveWell/sleep/Pages/sleep-home.aspxm or the National Sleep Foundation http://sleepfoundation.org**. If these sources do not answer your questions or provide you with sufficient advice and guidance it would be appropriate to speak with a healthcare professional or your child's GP in the first instance and they can provide further sources of advice and guidance or recommendations.**

Appendix 6. Additional detail relevant to parents' responses of 'other' in study one questionnaire

6.1. Other methods parents reported had been suggested to them to improve their child's sleep (relates to section 4.3.2, Table 11)

Suggestion (n=1)	Frequency (%)
Responding to child's needs	1 (0.4)

6.2. Reasons given by parents (n=9) as to why they had not tried out the method(s) suggested to them (related to section 4.3.2, Table 12)

Reason (n=8)	Frequency (%)
Read evidence it is damaging	2 (0.8)
Back up	1 (0.4)
Children individual. Need to try different ideas	1 (0.4)
Other methods were successful	1 (0.4)
Too expensive	1 (0.4)
Too tired or unable to 'see method' through	1 (0.4)
Try multiple	1 (0.4)
Wait and see	1 (0.4)

6.3. Reasons why parents (n=6) who perceived their child had a sleep problem did not seek help (relevant to section 4.3.3, Table 13).

Reason (n=6)	Frequency (%)
Sleep issues related to other aspects	2 (0.8)
Availability of resources	1 (0.4)
HCPs not been helpful with other queries	1 (0.4)
Not comfortable using certain types of sources	1 (0.4)
Separation anxiety phase	1 (0.4)
Trying to cope with other issues	1 (0.4)

Appendix 7. Study two participant information sheet

OXFORD BROOKES UNIVERSITY

Department of Psychology, Social Work & Publich Health
Headington Campus, Gipsy Lane, Oxford, OX3 0BP
Researcher: [Georgia Cook, georgia.cook-2014@brookes.ac.uk]
Supervisor: [Luci Wiggs, lwiggs@brookes.ac.uk, 01865 483710]

XXXX

Understanding the links between parents' thoughts, bedtime behaviours and children's sleep

Dear parent/guardian,

I am currently investigating what parents think about sleep and if this is related to what they think about their child's sleep, how they put their child to bed and their child's sleep pattern. I would like to invite you, your partner and your toddler (aged 12-24 months) to be involved in this study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

What is the purpose of the study?
Getting adequate amounts of good quality sleep is essential for our day-to-day functioning and specifically for children's development. Many infants and toddlers experience some form sleeplessness at one time or another. It is known that certain thoughts, feelings or beliefs parents hold can influence a child's sleep. The way children are settled to sleep has also been found to have the potential to influence a child's sleep. This research will examine if parents' thoughts about sleep, are related to their thoughts about their child's sleep, the way they settle their child and their child's sleep patterns. Most studies which have looked at the links between these things have focused on mothers and we are wanting to include fathers in this study so that we can learn more about the family unit. There are no right or wrong answers we are just interested in finding out more about these topics and the potential links between them. It is hoped that by understanding more about parents' thoughts and bedtime behaviours will help future researchers to develop new and appropriate ways to help the parents of children who have difficulty sleeping.

What will happen if my family takes part?
I will speak to you on the telephone to explain the study further, answer any questions you might have and ensure that your family is able to take part in the study. This phone call should take about 15 minutes. We are only able to include your family if:
your child is aged between 12 and 24 months at the time of the study
both parents and your child all currently live together and can all participate
parents include both a mother and a father
both parents can read and write English, in order to be able to understand and complete the questionnaires

If your child has a severe medical, developmental or psychiatric condition, which could affect their sleep your family would not be eligible to take part. I will then meet with you at your home (or an alternative convenient location) arranged at a time suitable for you. This meeting will take no longer than 15 - 20 minutes. At this meeting I will ask you to sign a consent form to say that you agree to take part in the study. You will be given a copy of this to keep. I will ask some simple questions about yourself and your child. I will also provide you and your partner with a questionnaire each to fill in separately (if you or your partner prefer I can give you details of how to fill out the questionnaire online instead). In order to help protect your anonymity questionnaire software will not record your computer IP address). The

questionnaire will ask you questions about you and your child, including: sleep, thoughts about sleep, being a parent and your bedtime behaviour.

The questionnaire will take approximately 20-30 minutes in total to complete. If you complete a paper version of the questionnaire I will collect the completed questionnaire when I return a week later.

After the visit we would like you to complete a sleep diary for 5 nights so that for each day and night we can see the time your child went to bed, the time they fell asleep, any awakenings during the night and the time they got up in the morning. We would also like the parent who is most involved in the child's nighttime care to keep a diary of their sleep. For this week we would also like your child and a parent (the one who is most involved in the child's night-time care) to wear what looks like a wristwatch but is actually a special piece of equipment called an actigraph (see image below) which is used to measure movement. This can be worn on the wrist for adults and/or ankle for children during the nighttime.

The actigraph records movement and we copy the results of these movements onto our computers. We can then use the information along with your sleep diary to measure when your child was asleep or awake. We will give you a diary and an actigraph at this visit and explain how they should be used and answer any questions you may have. One week later I will come to your house to collect the completed sleep diary, the actigraph and the completed questionnaire (if you or your partner filled out a paper version of the questionnaire). This visit should take about 5 minutes. You will also be asked at this meeting if you would like to be sent a summary print out of the actigraphs' data, so you can the overnight movement patterns, and a summary of the study results when it's all finished (likely to be summer 2017). There are no right or wrong answers at any stage of the study – we are just interested to hear about you and your partner's thoughts, beliefs and attitudes regarding your child's sleep.

Why have we been invited and do we have to take part?
All families who fit the research criteria who have applied directly to take part, responded to adverts, or are part of the Oxford Brookes Babylab database have been invited. We are hoping that in total about 50 families will take part in the study. To find out whether parents' thoughts and settling behaviours are related to their child's sleep patterns we need to speak to parents whose children have sleep difficulties and also to parents whose children do not have any difficulty with their sleep so we are hoping that a wide range of families will take part. Giving your permission and taking part in the study is entirely voluntary. If you wish to withdraw from the study at any stage you may do so, without giving a reason, up until the point of data analysis.

What are the benefits and risks of taking part?
We will be providing a £10 amazon voucher to families who complete the study. We are also hoping carrying out this research will allow me to complete my PhD project and hopefully, further scientific understanding about parenting and child's sleep. The main disadvantage is that participating in the study will take up some of your time. The assessments used in this study have been used in many other studies with parents and children and there have been no problems associated with their use.

What will happen to the results of the study?
The data will be stored confidentially, within the limitations of the law, with only the researcher and supervisor having access to it. All data collected will be kept anonymously and used only for the researcher's PhD project and any publications based on this research project. In accordance with University guidelines data generated in the course of the research will be kept securely, in paper or electronic form, for a period of ten years after the completion of a research project. No individual child, parent or family will be identified. To maintain confidentially it will not be possible for parents or families to have access to the results of

individual children, parents or families. However, at the end of the study a summary of the results can be made available to you and you can receive a print out of the actigraphy recordings giving diagrams of movements during the night.

What should I do if my partner and I are willing to take part with our child (12-24 months old)?
If you agree to take part, please contact the researcher (Georgia Cook) directly and a convenient time for a telephone chat will be agreed.

Thank you for taking time to read this. Georgia Cook

If you or your partner have any concerns about your own or your child's sleep, now or in the future you can get further guidance and information from the NHS http://www.nhs.uk/LiveWell/sleep/Pages/sleep-home.aspxm or the National Sleep Foundation http://sleepfoundation.org. If these sources do not answer your questions or provide you with sufficient advice and guidance it would be appropriate to speak with a healthcare professional or your or your child's GP in the first instance and they can provide further sources of advice and guidance or recommendations.

Appendix 8. Study two questionnaire language adaptations

Measure	Language adaptations
PSQI	Minor language adaptations were also made to ensure clarity and appropriateness for a UK audience. For example in question 3 'gotten' was changed to 'got', 'on average' was also added to 'during the past month, how many hours of actual sleep did you get at night? (for additional clarity as a result of piloting feedback. Additional guidance was added for questions regarding specific times (items 1 and 3) to ensure all times recorded in a standardised fashion. 'Please write this time in the format hh.mm and include if this was am / pm. For example: 10.56pm'. The option of 'not applicable to me' was added to item 'How often during the past month have you had trouble sleeping because of this?' to ensure there was a relevant response option for people who do not report any additional reasons for not being able to sleep.
Parental sleep practices (adapted SPAQ)	Minor language adaptations and additions were made to ensure clarity for UK audience. For example 'soda' was changed to fizzy drinks in items discussing caffeinated drinks. And Get up and read or watch TV was changed to 'Get up and do something (like read or watch TV)' to ensure it covered other similar activities people may partake in not just read/TV.
Parental knowledge and understanding about sleep (adapted from SPAQ)	Some minor language adaptations were made to ensure items were as clear as possible for a UK audience. For example 'not enough' was changed to 'insufficient' in the effects on daytime functioning section. Minor adaptations were made to some items for example where items in the original SPAQ when were phrased as questions these were re-worded to read as statements in the to maintain consistency with the wording of other questionnaires used in the study. For example 'how important is getting healthy sleep for adults?' Was re-phrased to read 'getting healthy sleep is important for adults'.
PIBBS	Minor language adaptations were also made to ensure relevance to the age range of children in this study. For example the word 'baby' was changed to 'child' and 'offer a special toy/cloth' was changed to offer a special toy/item'. The response option of 'bed' was added to items referring to the child's sleeping location (items 14 and 16) to ensure all potential sleep locations of the age range of children in the study were included.
CCQ	Minor language adaptations were made to the questionnaire to ensure it was appropriate and understandable to UK parents. For example the terms 'diaper' were changed to 'nappy' and 'infant seat' to 'highchair'.

Appendix 9. Study two questionnaire

Dear Parent,

Please find enclosed the questionnaire which you are asked to fill in as part of your involvement in the study of understanding the links between parents' thoughts, bedtime behaviours and children's sleep.

This should take no longer than 20-30 minutes to complete in total. If possible please complete all questions in one sitting. There are no right or wrong answers; we are just interested in your thoughts, feelings beliefs and attitudes.

Please read the instructions of each section carefully as there are some differences in the way you need to answer each one.

This questionnaire is structured into sections:
1. About you
2. Your sleep and your thoughts about sleep
3. About being a parent
4. Your child's sleep
5. Your thoughts about your child's sleep
6. Bedtime behaviour with your child
7. Your child

I will also email you a link to an online version of this questionnaire (to the email address given in the home visit at the start of the study) in case you would rather complete an online rather than paper version of the questionnaire.

If you have any questions or concerns please do not hesitate to contact the researcher, Georgia Cook at georgia.cook-2014@brookes.ac.uk**.**

I thank you for your time and participation.

Section 1. ABOUT YOU

Some questions about you:
Name: _____ **Date:** _____

Questionnaire completed by: Mother Father Other, Specify: _____

Age (in years): _____

Occupation: (please tick most appropriate)
- Managers, directors and senior officials
- Professional and technical occupations
- Administrative and secretarial occupations
- Skilled trade
- Caring, leisure and other service occupations
- Sales and customer service occupations
- Manual labour, process plant and machine operatives
- Student
- Unemployed
- Retired
- Full time parent
- Other, please specify _____

Education: (please tick most appropriate highest level of education)
- Compulsory school education
- College
- Vocational training or qualification (including apprenticeship)
- University degree (batchelors)
- University degree (masters)
- Further Postgraduate education

Some questions about your health

These next questions are about how **YOUR** health has been in general over the past few weeks. Please answer all the questions simply by circling the answer which you think most closely applies to you. Remember that we would like to know about your present and recent complaints, not those you had in the past. It is important that you try to answer ALL the questions.

Have you recently…				
...been able to concentrate on whatever you're doing	Better than usual	Same as usual	Less than usual	Much less than usual
...lost much sleep over worry	Not at all	No more than usual	Rather more than usual	Much more than usual
...felt that you are playing a useful part in things	More so than usual	Same as usual	Less so than usual	Much less than usual
...felt capable of making decisions about things	More so than usual	Same as usual	Less so than usual	Much less capable
...felt constantly under strain	Not at all	No more than usual	Rather more than usual	Much more than usual

...felt you couldn't overcome your difficulties	Not at all	No more than usual	Rather more than usual	Much more than usual
...been able to enjoy your normal day-to-day activities	More so than usual	Same as usual	Less so than usual	Much less than usual
...been able to face up to your problems	More so than usual	Same as usual	Less so than usual	Much less able
...been feeling unhappy and depressed	Not at all	No more than usual	Rather more than usual	Much more than usual
...been losing confidence in yourself	Not at all	No more than usual	Rather more than usual	Much more than usual
...been thinking of yourself as a worthless person	Not at all	No more than usual	Rather more than usual	Much more than usual
...been feeling reasonably happy, all things considered	More so than usual	Same as usual	Less so than usual	Much less than usual

Section 2: YOUR SLEEP AND YOUR THOUGHTS ABOUT SLEEP

Some questions about your sleep:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the **past month**.

Please answer all questions.
During the past month, what time have you usually gone to bed at night?
Please write this time in 24-hour clock format. For example if you fell asleep at 10.56pm, please write this as 22.56.
BED TIME _____

During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
NUMBER OF MINUTES _____

During the past month, what time have you usually got up in the morning?
Please write this time in 24-hour clock format. For example if you got up at 07.32am, please write this as 07.32.
GETTING UP TIME _____

During the past month, on average, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)
HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, Please indicate which statement is most relevant to you by ticking one most appropriate option per row. Please answer all questions.

	Not during the past month	**Less than once a week**	**Once or twice a week**	**Three or more times a week**
During the past month, how often have you had trouble sleeping because you . . .				
Cannot get to sleep within 30 minutes				
Wake up in the middle of the night or early morning				
Have to get up to use the bathroom				
Cannot breathe comfortably				
Cough or snore loudly				
Feel too cold				
Feel too hot				
Had bad dreams				
Have pain				
Other reason(s), please describe:				

During the past month, how would you rate your sleep quality overall?

Very good	Fairly good	Fairly bad	Very bad

During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week

During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month	Less than once a week	Once or twice a week	Three or more times a week

During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem

Some questions about your beliefs about sleep:
Please indicate to what extent you personally agree or disagree with each statement by ticking **one** most appropriate option per row.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
I would try to do the following if I am feeling sleepy during the day:					
sleep more at night or sleep better					
nap during the day					
increase caffeine from coffee, tea, fizzy or energy drinks					
increase exercise or physical activity					
I never feel sleepy					
I would try to do the following if I were having trouble sleeping tonight:					
stay in bed and get some rest					
do something in bed (like read or watch					

TV)					
get up and do something (like read or watch TV)					
eat or drink something					
drink alcohol					
smoke					
drink a caffeinated beverage such as coffee, tea, fizzy or energy drinks					
get up and start the day					
I would try to do the following if I were having trouble sleeping over a period of time:					
take medication to help me sleep					
make sure my mattress is comfortable and buy a new one if needed					
make sure I go to bed at a good time					
adjust the lighting in my bedroom					
adjust the temperature in my bedroom					
change my sleep schedule by going to bed or waking up at a different time					
reduce my intake of caffeine					
make sleep a priority in my life					
I do the following in bed:					
read					
watch TV or an electronic device					
eat or drink					
worry or spend time thinking					
argue or be angry					
do work					
The place where I sleep is:					
physically comfortable (mattress, pillows etc)					
dark					

a comfortable temperature					
quiet					

The following statements relate to adult sleep. Please indicate to what extent you personally agree or disagree with each statement by ticking **one** most appropriate option per row.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
My work affects when and how much I sleep					
Home responsibilities affect when and how much I sleep					
My commute affects when and how much I sleep					
My sleep is affected by medical conditions (like heart, breathing, or pain)					
I have difficulty with sleep					
Sometimes when I am feeling down or depressed, it affects my sleep					
Sometimes my sleep is affected because I feel unsafe at night					
I have control over when and how much I sleep					
I care about making sure that I have enough time to sleep					
Getting enough sleep is important for me to be able to enjoy the day					
Going to bed at a good time is important to me					
My sleep is important to my health					
My sleep is affected by stress and/or worrying					
Not enough sleep can lead to serious consequences					
Poor sleep affects the quality of my life					
Dozing while driving a vehicle is serious					
My doctor has discussed the importance of a regular sleep schedule					

My doctor has discussed the importance of getting enough sleep					
If you are really bored, you might fall asleep, even if you slept well the night before					
Lying in bed with your eyes shut is as good as sleeping					
I can tell when I am sleepy					
Opening the car window is a good way to wake me up if I am drowsy while driving					
Turning up the volume of the radio or music is a good way to wake me up if I am drowsy while driving					
People who fall asleep at work or school are lazy or have bad habits					
When growing up my parents emphasized the importance of sleep to me					
It is important for children who are growing up to get healthy sleep					
Getting healthy sleep is important for adults					
Getting healthy sleep is important for older adults/seniors					
I think my sleep is important					

Some questions about your thoughts about sleep:
Please indicate to what extent you personally agree or disagree with each statement by selecting **one** number that indicates where your personal rating falls for each question.

I need 8 hours of sleep to feel refreshed and function well during the day.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

When I don't get the proper amount of sleep on a given night, I need to catch up on the next day by napping or on the next night by sleeping longer.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I am concerned that chronic insomnia may have serious consequences on my physical health.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I am worried that I may lose control over my ability to sleep.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

After a poor nights sleep, I know that it will interfere with my daily activities on the next day.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

In order to be alert and function well during the day, I am better off taking a sleeping pill rather than having a poor night's sleep.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

When I feel irritated, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

Without an adequate night's sleep, I can hardly function the next day.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I can't ever predict whether I'll have a good night's sleep.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I have little ability to manage the negative consequences of disturbed sleep.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I believe insomnia is essentially the result of a chemical imbalance.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

A "nightcap" before bedtime is a good solution to sleeplessness.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

It usually shows in my physical appearance when I haven't slept well.

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

Section 3: BEING A PARENT

Please indicate the extent to which you agree or disagree with each of the following statements by circling **one** most appropriate option per row.

The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Even though being a parent could be rewarding, I am frustrated now while my child is at his / her present age.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

I go to bed the same way I wake up in the morning, feeling I have not accomplished a whole lot.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

I do not know why it is, but sometimes when I'm supposed to be in control, I feel more like the one being manipulated.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

My parent was better prepared to be a good parent than I am.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

I would make a fine model for a new parent to follow in order to learn what she would need to know in order to be a good parent.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Being a parent is manageable, and any problems are easily solved.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

A difficult problem in being a parent is not knowing whether you're doing a good job or a bad one.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Sometimes I feel like I'm not getting anything done.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

I meet my own personal expectations for expertise in caring for my child.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

If anyone can find the answer to what is troubling my child, I am the one.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

My talents and interests are in other areas, not being a parent.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Considering how long I've been a parent, I feel thoroughly familiar with this role.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

If being a parent of a child were only more interesting, I would be motivated to do a better job as a parent.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

I honestly believe I have all the skills necessary to be a good parent to my child.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Being a parent makes me tense and anxious.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree

Section 4: YOUR CHILD'S SLEEP

Please answer these questions about your child's sleep as accurately as you can. Please provide **one** answer to each question based on your child's sleep typical sleeping habits in the **LAST TWO WEEKS**. When responding to questions with a few options, please tick only **one** (most appropriate) choice.

Please complete questions about time in the following format:
Hours: __6___ Minutes: __24__
For example if your child slept from 8.00pm – 6.50am, they slept for 10 hours and 50 minutes, so you would write this as Hours: __10__ Minutes: __50__

How much time does your child spend in sleep during the NIGHT (between 7 in the evening and 7 in the morning)?
Hours: _____ Minutes: _____

How much time does your child spend in sleep during the DAY (between 7 in the morning and 7 in the evening)?
Hours: _____ Minutes: _____

Average number of night wakings per night: _____

How much time does your child spend awake from 10 in the evening to 6 in the morning?
Hours: _____ Minutes: _____

How long does it take to put your child to sleep in the evening?
Hours: _____ Minutes: _____

How does your child fall asleep?
While feeding Being rocked Being held In bed alone

In bed near parent

What time does your child usually fall asleep for the night?
Please write this time in 24-hour clock format. For example if your child fell asleep at 08.56pm, please write this as 20.56.

_____

Do you consider your child's sleep as a problem?
A very serious problem A small problem Not a problem at all

In this section we would like to know about your child's present sleeping habits. Your answer to the questions should be based on your child's typical sleeping habits during the LAST TWO WEEKS only. Please tick one (most appropriate option) per question.

How often does your child have problems settling at bed time?	Less than once a week	☐
	1 or 2 nights a week	☐
	3 or more nights a week	☐
How long does it take them to settle to sleep?	Few minutes	☐
	Up to 30 minutes	☐
	More than 30 minutes	☐
How often does your child wake in the night?	Less than once a week	☐
	1 or 2 nights a week	☐
	3 or more nights a week	☐
How long does it usually take to resettle him/her?	Few minutes	☐
	Up to 30 minutes	☐
	More than 30 minutes	☐
How often does your child wake before 5am in the morning and remain awake?	Less than once a week	☐
	1or 2 nights a week	☐
	3 or more nights a week	☐
How often does your child insist on sleeping with someone else for most/all of the night?	Less than once a week	☐
	1or 2 nights a week	☐
	3 or more nights a week	☐

How satisfied are you with your child's current sleep pattern?

Completely satisfied	☐
Mostly satisfied, although some aspects still cause problems	☐
Neither satisfied nor dissatisfied	☐
Mostly dissatisfied, although some aspects are OK	☐
Completely dissatisfied	☐

Section 5: YOUR THOUGHTS ABOUT YOUR CHILD'S SLEEP

The following statements relate to child sleep. Please indicate to what extent you personally agree or disagree with each statement by ticking **one** most appropriate option per row.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
My child's day affects how much they sleep					
Our home/family environment affects how much my child sleeps					
My child's sleep is affected by medical conditions (like heart, breathing, or pain)					
My child has difficulty with their sleep					
Sometimes if my child is feeling upset, it affects their sleep					
I have control over when and how much my child sleeps					
I care about making sure that my child has enough time to sleep					
Getting enough good quality sleep is important for my child to be able to enjoy the day					
Getting my child to sleep at					

a good time is important to me					
Sleep is important to my child's health					
If my child does not get enough sleep this can lead to serious consequences					
Poor sleep affects the quality of my child's life					
My child's health professional has discussed the importance of a regular sleep schedule for my child					
My child's health professional has discussed the importance of my child getting enough sleep					
If my child is really bored, they might fall asleep, even if they slept well the night before					
If my child lies in bed with their eyes shut that is as good as sleeping					
I can tell when my child is sleepy					
Children who fall asleep at nursery or school are lazy or have bad habits					
I prioritise the importance of sleep to my child					
Getting enough good quality sleep is important for children when they are growing up					
I think my child's sleep is important					

Some questions about your sleep practices with your child:
Please indicate to what extent you personally agree or disagree with each statement by ticking **one** most appropriate option per row.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
I would try to do the following if my child seems sleepy during the day:					
try and help them sleep more or sleep better					
put them down for a nap					
increase physical activity or play					

My child never seems sleepy					
I would try to do the following if my child were having trouble sleeping tonight:					
leave them in bed to try and get some rest					
give them something to do in bed (like toys or books)					
get them up and out of bed to do something (like play, read, watch TV)					
give them something to eat or drink					
get them up and out of bed to start the day					
I would try to do the following if my child were having trouble sleeping over a period of time:					
give medication to help them sleep					
make sure my child's mattress is comfortable and buy a new one if needed					
make sure my child goes to bed at a good time					
adjust the lighting in my child's bedroom					
adjust the temperature in my child's bedroom					
change my child's sleep schedule so they go to bed or wake up at a different time					
make my child's sleep a priority in my life					
My child does the following in bed:					
is read to					
watches TV or an electronic device					
eat or drink					
play					
The place where my child sleeps is:					
physically comfortable (mattress, pillows etc)					
dark					
a comfortable temperature					
quiet					

Some questions about your thoughts about your child's sleep:
Here are a series of statements about thoughts and feelings parents may have when faced with a child that won't sleep. After reading each statement **circle the one response** that most closely represents how you yourself would feel with your child. There are no right or wrong answers so don't take too long

thinking about your answer, it is your thoughts and opinions we are interested in.

When my child cries at night, I think something awful might have happened to him/her

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

My child might die unexpectedly in his/her sleep

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

My child will feel abandoned if I don't respond immediately to his/her cries at night

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

It is all right to allow my child to cry at night

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child cries at night, I think I might lose control of myself and harm him/her

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child wakes at night, I think he/she might not have had enough attention during the day

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

I should be getting up during the night to check that my child is still all right

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

If I try to resist my child's demands at night, then I think I might get very angry

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child wakes crying, I always know what he/she needs

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child cries at night and needs me, I wish he/she wasn't so demanding

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

If I try to resist my child's demands at night, then he/she will get even more upset

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child doesn't sleep at night, I doubt my competence as a parent

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

If I say no to my child's demands at night, then that means I'm a bad parent

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

I am able to let my child sleep on his/her own

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

When my child cries at night, I can find myself thinking I wish I had never had a child

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

I should respond straightaway when my child wakes crying at night

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

I am able to resist my child's demands when he/she wakes at night

Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree

Section 6: BEDTIME BEHAVIOUR WITH YOUR CHILD

Some questions about how you settle your child to sleep:

Which methods do you use to help settle your child off to sleep? How often do you use each one? Please tick one (most appropriate) option per row:

	Never	Rarely	Sometimes	Often	Very Often
Stroke part of child or pat					
Cuddling or rocking in arms					
Carrying around house in arms					
Walks in pram or buggy					
Car rides					
Music tape or musical toy					
Talking softly to child					
Singing a lullaby					
Reading a story to child					
Playing with child					
Offer a special toy/item					
Give a feed/drink					
Leave to cry					
Stand near cot or bed without picking child up					
Settle on sofa with parent					
Lie with child next to their cot or bed					
Settle in parent's bed					
Give sleeping medication					
Give alcohol					
Put child in their own bed / cot and leave them to settle themselves					

Section 7: YOUR CHILD

On the following questions please **circle one number** that is most typical of your child for each question. "About average" means how you think the typical child would be scored.

How easy or difficult is it for you to calm or soothe your child when he/she is upset?

1	2	3	4	5	6	7
Very easy			About average			difficult

How consistent is your child in sticking to his/her sleeping routine?

1	2	3	4	5	6	7
very consistent; little or no variability			some variability			very inconsistent; highly variable

How consistent is your child in sticking to his/her eating routine?

1	2	3	4	5	6	7
very consistent; little or no variability			some variability			very inconsistent; highly variable

How easy or difficult is it for you to know what's bothering your child when he/she cries or fusses?

1	2	3	4	5	6	7
Very easy			About average			difficult

How many times per day, on average, does your child get fussy and irritable—for either short or long periods of time?

1	2	3	4	5	6	7
never	1-2 times per day	3-4 times per day	5-6 times per day	7-9 times per day	10-14 times per day	more than 15 times per day

How much does your child cry and fuss in general?

1	2	3	4	5	6	7
very little; much less than the average child			Average amount; about as much as the average child			A lot; much more than the average child

How does your child typically respond to new playthings?

1	2	3	4	5	6	7
always responds favourably			responds favourably about half the time, or is always neutral			negatively or fearfully

How does your child typically respond to new foods?

1	2	3	4	5	6	7
always responds favourably			responds favourably about half the time, or is always neutral			negatively or fearfully

How does your child typically respond to a new person?

1	2	3	4	5	6	7
always responds favourably			responds favourably about half the time, or is always neutral			negatively or fearfully

How does your child typically respond to being in a new place?

1	2	3	4	5	6	7
always responds favourably			responds favourably about half the time, or is always neutral			negatively or fearfully

How well does your child adapt to new experiences (such as items 7-10) eventually?

1	2	3	4	5	6	7
Very well, always likes it eventually			Ends up liking it about half the time			Almost always dislikes it in the end

How easily does your child get upset?

1	2	3	4	5	6	7
Very hard to upset – even by things that upset most children			About average			Very easily upset by things that wouldn't bother other children

When your child gets upset, how vigorously or loudly does he/she cry and fuss?

1	2	3	4	5	6	7
Very mild intensity or loudness			Moderate intensity or loudness			Very loud or intense

How does your child react when you are dressing him/her?

1	2	3	4	5	6	7
Very well – likes it			About average – doesn't mind it			Doesn't like it at all

How active is your child in general?

1	2	3	4	5	6	7
Very calm and quiet			average			Very active and vigorous

How much does your child smile and make happy sounds?

1	2	3	4	5	6	7
A great deal, much more than most children			An average amount			Very little, much less than most children

What kind of mood is your child generally in?

1	2	3	4	5	6	7
Very happy and cheerful			Neither serious nor cheerful			Serious

How much does your child enjoy playing with you?

1	2	3	4	5	6	7
A great deal, really loves it			About average			Very little, doesn't like it very much

How much does your child want to be held?

1	2	3	4	5	6	7
wants to be free most of the time			Sometimes wants to be held sometimes not			A great deal - wants to be held most of the time

How does your child respond to disruptions and changes in everyday routine, such as when you go to church or a meeting, on trips, etc.?

1	2	3	4	5	6	7
Very favourably, doesn't get upset			About average			Very unfavourably, gets quite upset

How changeable is your child's mood?

1	2	3	4	5	6	7
Changes seldom, and changes slowly when he/she does changes			About average			Changes often and rapidly

How excited does your child become when people play with or talk to him/her?

1	2	3	4	5	6	7
Very excited			About average			Not at all

On the average, how much attention does your child require, other than for caregiving (feeding, nappy changes, etc.)?

1	2	3	4	5	6	7
Very little – much less than average			Average amount			A lot – much more than the average child

When left alone, your child plays well by himself/herself?

1	2	3	4	5	6	7
Almost always			About half the time			Almost never – wont play by self

How does your child react to being confined (as in a carseat, highchair, playpen, etc.)?

1	2	3	4	5	6	7
Very well – likes it			Minds a little or protests once in awhile			Doesn't like it at all

How much does your child cuddle and snuggle when held?

1	2	3	4	5	6	7
A great deal – almost every time			Average, sometimes does and sometimes does not			Very little seldom cuddles

How easy or difficult is it to take your child places?

1	2	3	4	5	6	7
Easy; fun to take child with me			Okay; child may fuss but no real trouble			Difficult; child is usually disruptive

Does your child persist in playing with objects when he/she is told to leave them alone?

1	2	3	4	5	6	7
Rarely or never persists			Sometimes does and sometimes not			Almost always persists

Does your child continue to go someplace even when told something like "stop", "come here", or "no-no"?

1	2	3	4	5	6	7
Rarely or never			Sometimes does and sometimes not			Almost always

When removed from something he/she is interested in but should not be getting into, your child gets upset.

1	2	3	4	5	6	7
Never			Sometimes does and sometimes doesn't			Always gets very upset

How persistent is your child in trying to get your attention when you are busy?

1	2	3	4	5	6	7
Doesn't persist at all			Will try, but will only mildly persist			Very persistent will do anything to get attention

Please rate the overall degree of difficulty your child would present for the average mother.

1	2	3	4	5	6	7
Super easy			Ordinary, some problems			Highly difficult to deal with

You have finished the questionnaire!

Thank you very much for taking the time to complete this questionnaire. Please return this completed packet of questionnaires to the researcher when she comes to see you next week (date:_____ and time _____).

If you have any queries or questions, please do not hesitate to contact me. I can be contacted at georgia.cook-2014@brookes.ac.uk

If you or your partner have any concerns about your own or your child's sleep, now or in the future you can get further guidance and information from the NHS http://www.nhs.uk/LiveWell/sleep/Pages/sleep-home.aspxm or the National Sleep Foundation http://sleepfoundation.org. If these sources do not answer your questions or provide you with sufficient advice and guidance it would be appropriate to speak with a healthcare professional or your or your child's GP in the first instance and they can provide further sources of advice and guidance or recommendations.

Appendix 10. Child demographic information interview

(completed by researcher at house visit with parent)

Form completed by: _____ Date: _____

Responder: _____ Mother Father Other

Child Details:

Name of Child: _____

Age of child (in months): _____

Sex: Male Female

How many children in household: _____ Only Child

Date or Birth of Siblings: _____

Birth order of the child: Oldest Middle Youngest

Birth:
Was you child born at: Full term Premature, how many weeks, _____

What was your child's birth weight: _____

Medication:
Is your child on any regular medication: _____

Is your child taking any medication currently: _____

If yes, what is this medication for: _____

Child Health:
History: Anything important relating to your child's health or development I need to know:

_____
_____

Recent Health: Has your child been suffering for any illness, injury or ailments in the last month:

_____
_____

Have you seen your child's doctor, health visitor or any other healthcare professional recently for any specific health issues:

_____
_____

Anything else you think it is important I know:

_____

_____
_____
_____

Sleeping arrangements:

Where does your child sleep most of the time?

Own room Parents room Room with a sibling
Other, specify: _____

In what

Cot Own bed Other, specify: _____

If own bed what type?

Single bed Cot bed Other, specify: _____

What position does your child sleep in most of the time?

On his/her back On his/her belly On his/her side

What type of bedding do you use with your child most often?

Blanket Duvet Sleeping bag
Other, specify: _____

Other:

Mother email for online version of questionnaire:

Father email for online version of questionnaire:

Would you be happy to be contacted about future research being conducted by the Oxford Brookes Babylab?

Yes
No

Any comments:

_____
_____

Appendix 11. Parental practices relating to their own sleep (SPAQ-A-P) items and classification of individual items

Full list of SPAQ-A-P items included. For classification, items highlighted in green were classified as representing positive or good sleep-related knowledge. Items highlighted in red were classified as representing negative or bad sleep-related knowledge. Items in black were omitted from classification.

I would try to do the following if I am feeling sleepy during the day:
- sleep more at night or sleep better
- nap during the day
- increase caffeine from coffee, tea, fizzy or energy drinks
- increase exercise or physical activity
- I never feel sleepy

I would try to do the following if I were having trouble sleeping tonight:
- stay in bed and get some rest
- do something in bed (like read or watch TV)
- get up and do something (like read or watch TV)
- eat or drink something
- drink alcohol
- smoke
- drink a caffeinated beverage such as coffee, tea, fizzy or energy drinks
- get up and start the day

I would try to do the following if I were having trouble sleeping over a period of time:
- take medication to help me sleep
- make sure my mattress is comfortable and buy a new one if needed
- make sure I go to bed at a good time
- adjust the lighting in my bedroom
- adjust the temperature in my bedroom
- change my sleep schedule by going to bed or waking up at a different time
- reduce my intake of caffeine
- make sleep a priority in my life

I do the following in bed:
- read
- watch TV or an electronic device
- eat or drink
- worry or spend time thinking
- argue or be angry
- do work

The place where I sleep is:
- physically comfortable (mattress, pillows etc)
- dark
- a comfortable temperature
- quiet

Appendix 12. Parental practices relating to child sleep. Original SPAQ items included and adapted wordings used to assess parental practices in relation to child sleep (SPAQ-C-P)

The left column shows original SPAQ items included to assess parental practices relating to their own sleep. Any items omitted are highlighted with 'removed' in the right hand column. Text in the right hand column shows the adapted item wording to ensure items were relevant to assess parental practices relating to child sleep.

Parental practices relating to their child's sleep (SPAQ-C-P) classification of individual items
Items highlighted in green in the right hand column were classified as representing positive or good sleep-related knowledge. Items highlighted in red were classified as representing negative or bad sleep-related knowledge. Items in black were omitted from classification.

Original SPAQ adult wording	Adapted for child wording
I would try to do the following if I am feeling sleepy during the day:	**I would try to do the following if my child seems sleepy during the day:**
sleep more at night or sleep better	try and help them sleep more or sleep better
nap during the day	put them down for a nap
increase caffeine from coffee, tea, fizzy or energy drinks	**Removed**
increase exercise or physical activity	increase physical activity or play
I never feel sleepy	My child never seems sleepy
I would try to do the following if I were having trouble sleeping tonight:	**I would try to do the following if my child were having trouble sleeping tonight:**
stay in bed and get some rest	leave them in bed to try and get some rest
do something in bed (like read or watch TV)	give them something to do in bed (like toys or books)
get up and do something (like read or watch TV)	get them up and out of bed to do something (like play, read, watch TV)
eat or drink something	give them something to eat or drink
drink alcohol	**Removed**
smoke	**Removed**
drink a caffeinated beverage such as coffee, tea, fizzy or energy drinks	**Removed**
get up and start the day	get them up and out of bed to start the day

Original SPAQ adult wording	Adapted for child wording
I would try to do the following if I were having trouble sleeping over a period of time:	I would try to do the following if my child were having trouble sleeping over a period of time:
take medication to help me sleep	give medication to help them sleep
make sure my mattress is comfortable and buy a new one if needed	make sure my child's mattress is comfortable and buy a new one if needed
make sure I go to bed at a good time	make sure my child goes to bed at a good time
adjust the lighting in my bedroom	adjust the lighting in my child's bedroom
adjust the temperature in my bedroom	adjust the temperature in my child's bedroom
change my sleep schedule by going to bed or waking up at a different time	change my child's sleep schedule so they go to bed or wake up at a different time
reduce my intake of caffeine	**Removed**
make sleep a priority in my life	make my child's sleep a priority in my life
I do the following in bed:	My child does the following in bed:
read	is read to
watch TV or an electronic device	watches TV or an electronic device
eat or drink	eat or drink
worry or spend time thinking	**Removed**
argue or be angry	**Removed**
do work	play
The place where I sleep is:	The place where my child sleeps is:
physically comfortable (mattress, pillows etc)	physically comfortable (mattress, pillows etc)
dark	dark
a comfortable temperature	a comfortable temperature
quiet	quiet

SPAQ-C-P wording adaptations. Left column shows original SPAQ-A-P wording and right column shows adapted wording for child relevant knowledge statements.

Appendix 13. Parental knowledge relating to adult sleep (SPAQ-A-K) items and classification of individual items

Items highlighted in green were classified as representing positive or good sleep-related knowledge. Items highlighted in red were classified as representing negative or bad sleep-related knowledge. Items in black were omitted from classification.

My work affects when and how much I sleep
Home responsibilities affect when and how much I sleep
My commute affects when and how much I sleep
My sleep is affected by medical conditions (like heart, breathing, or pain)
I have difficulty with sleep
Sometimes when I am feeling down or depressed, it affects my sleep
Sometimes my sleep is affected because I feel unsafe at night
I have control over when and how much I sleep
I care about making sure that I have enough time to sleep
Getting enough sleep is important for me to be able to enjoy the day
Going to bed at a good time is important to me
My sleep is important to my health
My sleep is affected by stress and/or worrying
Not enough sleep can lead to serious consequences
Poor sleep affects the quality of my life
Dozing while driving a vehicle is serious
My doctor has discussed the importance of a regular sleep schedule
My doctor has discussed the importance of getting enough sleep
If you are really bored, you might fall asleep, even if you slept well the night before
Lying in bed with your eyes shut is as good as sleeping
I can tell when I am sleepy
Opening the car window is a good way to wake me up if I am drowsy while driving
Turning up the volume of the radio or music is a good way to wake me up if I am drowsy while driving
People who fall asleep at work or school are lazy or have bad habits
When growing up my parents emphasized the importance of sleep to me
It is important for children who are growing up to get healthy sleep
Getting healthy sleep is important for adults
Getting healthy sleep is important for older adults/seniors
I think my sleep is important

SPAQ-A-K classification of items. Green = positive, red = negative, black=omitted from classification.

Appendix 14. Additional Questionnaire amendments from piloting

The study 2 questionnaire was constructed by amalgamating a number of existing or elements of existing questionnaires. When the questionnaire was piloted a number of aspects of feedback focused around adding additional instruction or clarity to instructions. This was mainly deemed necessary because of the different reporting scales and information requested from parents. For example in the BISQ and PSQI questionnaires parents are asked to report a time and so additional instruction regarding the reporting of this was added. Minor changes were made to address all parental comments made during piloting.

The questionnaire could be completed via a paper or online copy, based on parental preference. A number of minor formatting elements were commented on by parents but again mainly focused around ease of viewing and navigation. For example for some questionnaires with many items (mainly SPAQ questionnaires) parents reported being required to scroll up and down for the Likert scale. All relevant aspects were addressed to respond to parental comments and ensure the online version was clear and easy to view and navigate.

Appendix 15. Missing data management

Procedure
The process of pro-rating was used as such that where individual items were missing which were relevant to a subscale or total score, the score with the missing item was calculated. Using this score as a guide to ascertain for example for some items the frequency with which the person reported undertaking a certain behaviour (for example on the PIBBS) or level agreement with statements about a certain type of thought (for example on the PCISQ). A new proportional score is then calculated including the missing item in the relevant subscale or total score. For example if a parent had given responses to 4 out of 5 items on a subscale and their average score was a 4 then the fifth item would be assumed to be scored as a 4 when their subscale score was calculated.

For level of parental agreement, a congruence score could be calculated for all items were both parents had provided responses to items. Level of agreement can then be pro-rated to generate a proportional agreement score with the additional item. For example if parents had agreement on 15 out of 30 items but 10 items were omitted, level of parental agreement could pro-rated to 20 out of 40 items. Where it was not possible to exactly pro-rate, due to the number of items for example, parental agreement was rounded so that if anything parental agreement was overestimated.

Frequency of Pro-rating
Pro-rating was applied to 4 individual missing items on the PSOC; 6 individual items on the PCISQ; 3 individual missing items on the PIBBS; 4 individual items on the DBAS; 2 individual items on the CCQ; 2 individual items on the SPAQ-A-K.

Pro-rating was also applied to SPAQ questionnaires whereby full parental responses were required to calculate level of parental agreement. This was applied to 19 individual SPAQ-A-P items and; 13 SPAQ-C-P.

One father left out 5 questionnaires (PSOC, BISQ, CSDI, SPAQ-C-K and PCISQ). One father left out over half of one questionnaire 1 questionnaire (CCQ). Upon review due to the extensive amount of data collected per family, data was included for descriptive presentation of completed measures and where small amounts of pro-rating where required (included in figures above) then omitted where whole questionnaires or subscales or parental agreement were not able to be calculated.

Additional data handling
In all cases where participants were requested to provide one figure and this was required for analysis but where a numerical banding was supplied the midpoint of the banding was selected for analysis. For example if when asked for their bedtime they responded 9.30-10pm, 9.45pm was the figure used for analysis purposes. This approach was used for 13 individual participant items in the PSQI and 6 individual participant items in the BISQ.

On the PSQI this was applied for 4 participants for the item relating to Bedtime; 4 participants in relation to time asleep (mins); 3 participants for get up time item and; 6 participants for number of hours sleep per night.

On the BISQ this approach was applied for 1 participant in response to item about amount of night sleep; 1 participant for nocturnal wakefulness; 3 participants for number of night-wakes and; 1 participant for fall asleep time.

On the PSQI there is an item regarding additional reasons and frequency of these events to sleep disturbance. 29 participants did not provide a response to this question. However given 39 participants reported N/A it was deemed of the 56 participants also left the frequency of this other reason blank (including the 29 who didn't answer the other reasons question) it was upon review decided if participants had not provided a reason for selected a frequency that there were no other relevant reasons. Therefore any participant missing a frequency figure was assigned the lowest frequency option of 'not during the past month'. 3 other participants reported 'other reasons' for restlessness did not report frequency, upon review of the reasons and to avoid overestimating these they were assigned a 0 of 'not during past month'. One participant reported breastfeeding a 12-week-old child and so upon review was assigned the highest value of 3.

In 2 cases parental responses regarding child nocturnal wakefulness (BISQ) upon review were omitted as participants appeared to have misread the question and reported amount of child nocturnal sleep not amount of child nocturnal wakefulness.